

D.4 Biological Resources

This section addresses the environmental setting and impacts for biological resources, including subsections covering vegetation and wetlands, wildlife, and marine and aquatic biology. Section D.4.1 describes the existing environment in which the Proposed Project and alternatives would be located. Section D.4.2 presents relevant laws and regulations. Sections D.4.3 through D.4.5 describe the potential impacts of the Proposed Project and alternatives, and Section D.4.6 discusses mitigation monitoring.

There is additional information on biological resources presented in Appendix 1. Appendix 1A presents descriptions of sensitive wildlife and plant species that are likely to be affected by the Proposed Project. Appendix 1B is a table defining the likely occurrence of sensitive species by project segment. Appendices 1C, 1D, and 1E support wetlands delineations completed by SFPP: Appendix 1C and 1D contain more specific tables identifying the waters of the U.S. in the project study area by milepost and affected wetland acreages, respectively, and Appendix 1E includes 1" = 400' scale jurisdictional delineation maps on aerial photographs.

D.4.1 Environmental Baseline

This section describes existing biological resources within the region of the Proposed Project, specific biological resources within the seven project segments, and the federal, State, and local regulations applicable to existing biological resources. The project area includes the Applicant's proposed pipeline corridor, which extends approximately 70 miles from Concord to Sacramento, California. The project area is defined as the area that may be disturbed during construction, operation, and maintenance of the project, including a 100-foot construction right-of-way (ROW), construction laydown areas, horizontal directional drill (HDD) setup areas, pipe-stringing and staging areas associated with the proposed pipeline route.

The long length of the project corridor, together with its geology, soils, hydrology, and climate, combine to create an extremely diversified mosaic of vegetation communities and associated wildlife. Sensitive and important aquatic areas within the Proposed Project alignment include the Sacramento–San Joaquin Bay Delta system, Yolo Bypass, and watersheds of the Carquinez Strait, Suisun Marsh (Grizzly Bay), Putah Creek, and the lower Sacramento River. These areas, along with other wetted natural communities within the project, support a variety of wetland habitat types, including brackish water marsh, seasonal freshwater marsh, alkali marsh, tidal marsh, vernal pools, open water, riparian forest, and riparian scrub. Upland habitats that occur in the vicinity of the proposed route include disturbed annual grassland, oak woodland, ruderal areas, pastureland, and cultivated croplands.

D.4.1.1 Regional Overview

Vegetation and Wetlands

This description of vegetation types in the project area is based on a field visit conducted July 5, 2002 and a review of available existing information including the Biological Assessment prepared for SFPP by URS (2002), estimates based on 1" = 400' scale aerial photography of the pipeline alignment prepared by SPEC Services, Inc., the National Wetlands Inventory (U.S. Fish and Wildlife, 1992), and jurisdictional delineation of wetlands by URS from surveys in March 2003. The project area described in this section includes a 100-foot construction ROW along the pipeline alignment. Descriptions use the classification system for natural communities developed by Holland (1986).

The proposed pipeline alignment is located within the watersheds of the Carquinez Strait, Suisun Marsh (Grizzly Bay), and the lower Sacramento River. Upland vegetation types in the project area include annual grassland, native perennial grassland, oak woodland, ruderal areas, cultivated fields, and riparian forest. The wetland vegetation types in the project area include riparian scrub, freshwater marsh, brackish marsh, tidal marsh, seasonal alkali marsh, vernal pool, and freshwater seep.

Table D.4-1. Waters of the U.S., Including Wetlands, in the Project Study Area by Type

Feature Type	Area (acres)
Brackish Marsh	10.6
Freshwater Marsh	7.9
Riparian Forest	6.6
Riparian Scrub	1.6
Seasonal Alkali Marsh	37.9
Seasonal Marsh	169.8
Seasonal Seep	0.3
Vernal Pool	2.8
Non-Wetland Waters	52.7
Total Wetlands in the Study Area	237.5
Total Waters of the U.S. in the Study Area	290.2

Source: URS, 2003.

Figure D.4-1 illustrates the habitat types along the proposed alignment and Table D.4-1 lists the acreages of the waters of the U.S. in the project study area by type.

Most of the land traversed by the proposed alignment has been converted to intensive cultivation or urban development. Urban areas include the communities of Martinez, Benicia, Fairfield, Suisun City, and West Sacramento. Cultivated areas are concentrated along the proposed alignment several miles west of Fairfield and between McCrory Road and the Yolo Bypass. Cultivation and urban development have largely displaced the natural upland vegetation. Brief descriptions of the vegetation types in the project area are provided below.

- Annual Grassland.** Non-native grasses that were introduced during European settlement of the Central Valley dominate the annual grasslands in the project area. Typical species include ripgut brome (*Bromus diandrus*), long-beaked filaree (*Erodium botrys*), yellow star-thistle (*Centaurea solstitialis*), softchess (*Bromus hordeaceus*), rattail fescue (*Vulpia myuros*), foxtail barley (*Hordeum murinum* spp. *leporinum*), medusa-head (*Taeniatherum caput-medusae*), and slender wild oat (*Avena barbata*). Cattle currently graze most of the annual grassland in the project area. Some of the annual grassland has been disked for fire prevention or weed control.
- Oak Woodland.** Oak Woodlands in the project area are composed primarily of blue oak (*Quercus douglasii*). Other species include interior live oak (*Quercus wislizenii*), buckeye (*Aesculus californicus*), and valley oak (*Quercus lobata*). Oak woodland in the project area is limited to a short segment west of Lopes Road and a smaller segment east of Cordelia Slough.
- Ruderal Area.** Ruderal vegetation is found in disturbed areas throughout the project area. Herbaceous, non-native species such as willow herb (*Epilobium brachycarpum*), prickly lettuce (*Lactuca serriola*), black mustard (*Brassica nigra*), bur clover (*Medicago polymorpha*), and short pod mustard (*Hirschfeldia incana*) typically dominate these areas. Other species found in ruderal areas include yellow star-thistle (*Centaurea solstitialis*), Italian thistle (*Carduus pycnocephalus*), and milk thistle (*Silybum marianum*). Some of the ruderal areas along the abandoned railroad grade in Yolo County and near the margins of the wetland areas adjacent to the Carquinez Strait are dominated by broad-leaved peppergrass (*Lepidium latifolium*), an invasive, non-native species. Most ruderal areas are associated with disturbed sites near urban areas or cultivated fields. Many of these species are weeds included on the California Exotic Pest Plant Council List A or the Red Alert list of species that are serious problems in wildlands (CalEPPC, 1999). Some are identified as a noxious weed with potential to damage agriculture by the California Department of Agriculture.

Figure D.4-1. Habitat Types

- **Cultivated Field.** A large portion of the project area that is not urbanized is cultivated for the production of crops or to provide irrigated pasture. Typical crops include tomatoes, sorghum, corn, winter wheat, safflower and alfalfa. Most of the cultivated area is located between Fairfield and the Yolo Bypass (MP 30.0 to MP 60.0).
- **Riparian Forest.** Riparian forest in the project area occurs along the margins of creeks and channels. Riparian species are typically deep rooted and a water table may be seasonally present near the surface. Some riparian forests may be considered jurisdictional by the Corps of Engineers. Riparian forests have a dense overstory of trees and small shrubs. Typical species associated with this vegetation type include California box elder (*Acer negundo* var. *californicum*), Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), valley oak (*Quercus lobata*), Oregon ash (*Fraxinus latifolia*), Himalayan blackberry (*Rubus discolor*), California blackberry (*Rubus ursinus*), and willows (*Salix* spp.). Blue elderberry (*Sambucus mexicana*), is associated with the riparian forest in the vicinity of Suisun Creek.
- **Riparian Scrub.** Riparian scrub the project area is associated with the smaller streams and sloughs (e.g., Maine Prairie Creek). This wetland type is typically dominated by hydrophytic willows that require a perennial source of soil moisture. Typical plant species include sandbar willow (*Salix exigua*), red willow (*Salix laevigata*), buttonwillow (*Cephalanthus occidentalis*), Himalayan blackberry, and immature Fremont cottonwood.
- **Freshwater Marsh.** Freshwater marsh in the project area is associated with the margins of streams, irrigation channels, and sloughs where surface water is present during all or most of the dry season. Many of the sites where freshwater marsh is present have enhanced flows from farm irrigation, treated municipal wastewater, or residential irrigation. Typical plant species include emergent species such as tule (*Scirpus acutus*, *S. americanus*) or cattail (*Typha latifolia*), and floating species such as yellow waterweed (*Ludwigia peploides*) or water smartweed (*Polygonum amphibium*).
- **Brackish Marsh.** Brackish marshes are wetlands with salinity that is intermediate between salt and freshwater wetlands. They typically occur along channels at the upper end of tidal marshes where hydrology is influenced by both tidal action and freshwater sources. They have some species in common with freshwater wetlands. Typical plant species include emergent species such as California bulrush (*Scirpus californicus*), American bulrush (*Scirpus americanus*), and narrowleaf cattail (*Typha angustifolia*)
- **Salt Marsh.** Salt marshes occupy the upper intertidal zone. Typical plant species include pickleweed (*Salicornia virginica*), alkali heath (*Frankenia salina*), jaumea (*Jaumea carnosa*), alkali bulrush (*Scirpus robustus*), and arrowgrass (*Triglochin maritima*). These plant species are able to tolerate higher soil salinity levels than brackish marsh species.
- **Seasonal Alkali Marsh.** Seasonal alkali marsh is a wetland type that often occupies sites that were once tidal marsh before construction of levees isolated them from tidal hydrology. Residual soil salinity, lack of tidal inundation, and concentration of salts through evaporation result in higher dry season salinity in this wetland type than in tidal marsh. Typical plant species are similar to tidal marsh but include some species such as western sea-purslane (*Sesuvium verrucosum*), alkali weed (*Cressa truxilensis*), and brass buttons (*Cotula coronopifolia*) that are less common in tidal marsh.
- **Vernal Pool.** Vernal pool wetlands are shallow depressions or swales on soils that have an impermeable layer. Water ponds in the depression when a perched water table forms above the impermeable layer during the wet season. Vernal pools and swales in the project area occur on soils derived from alluvium that have a layer of accumulated clay one or two feet below the ground surface. Salts and other alkaline compounds accumulate in the surface layers of the soils. Hydrophytic annual herbs and grasses with shallow roots dominate the depressions (Holland, 1986). Most vernal pool plants germinate during the wet season but most growth occurs after the water begins to recede in the spring. Vernal pools are associated with annual grassland and native perennial grassland in the project area.

Brief, seasonal inundation and characteristic hydrophytic plants distinguish vernal pools from seasonal marsh. Vegetation varies somewhat from pool to pool in both cover and species composition, but the majority of pools support several characteristic species. Obligate wetland species such as slender popcornflower (*Plagiobothrys stipitatus* var. *micranthus*), downingia (*Downingia concolor*, *D. insignis*, *D. ornatissima*, *D. bicornuta*, and *D. pulchella*), California semaphore grass (*Pleuropogon californicus*), and goldfields (*Lasthenia glaberrima*, *L. chrysantha*, *L. platycarpa*, and *L. conjugens*) are typical of many vernal pools in the project area.

- **Freshwater Seep.** Freshwater seeps occur where groundwater discharge onto slopes saturates soils but does not typically result in ponding. Only one occurrence of freshwater seep is documented in the project area west of Lopes Road near MP 14.5. Plant species include herbaceous species capable of tolerating saturated soils such as Baltic rush (*Juncus balticus*), toad rush (*Juncus bufonius*), iris-leaf rush (*Juncus xiphioides*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), annual bristly ox-tongue (*Picris echioides*) and saltgrass (*Distichlis spicata*).
- **Seasonal Marsh.** Seasonal marsh wetlands are ponded or have seasonally saturated soils. These wetlands tend to have deeper soils, which retain water longer than vernal pools, but are drier than freshwater marsh wetlands, becoming desiccated during the summer. Most of the seasonal wetlands in the project area are associated with low gradient swales and drainage features that capture surface runoff and remain saturated or inundated for several months of the year. Some vernal pool species, such as coyote thistle (*Eryngium aristulatum* var. *aristulatum*) occur sporadically in seasonal marsh. However, typical plant species include spikerush (*Eleocharis macrostachya*), flowering quillwort (*Lilaea scilloides*), brass buttons (*Cotula coronopifolia*), and rabbits foot grass (*Polypogon monspeliensis*).
- **Developed Area.** Developed area is characterized by structures, pavement and predominantly unvegetated disturbed areas. Vegetation may or may not occur and natural vegetation types are typically absent. Vegetation in developed areas could include ruderal areas dominated by weed species as well as landscaping.

Wildlife and Aquatic Species

The broad range of native terrestrial and aquatic habitats within the project area support a variety of associated wildlife. Non-native habitats crossed by this pipeline include roads and road shoulders, cultivated croplands, ruderal areas, and annual grassland. Native habitats found adjacent to or crossed by the proposed route include oak woodland, wetland/aquatic habitats including riparian forest, riparian scrub, freshwater marsh, brackish marsh, tidal marsh, seasonal alkali marsh, vernal pool, freshwater seep, seasonal marsh, and streams and channels (see Figure D.4-1).

The predominant habitats occurring within the project area are cultivated croplands and annual grasslands (pasture). Because cultivated agricultural areas are plowed each year, ground-dwelling wildlife are unable to establish permanent self-sustaining populations. The uniformity of, and constant human activity in agricultural habitats make these areas undesirable for most native wildlife. As a result, agricultural fields support a limited assemblage of native and nonnative wildlife. Species able to reside or forage in agricultural areas include the Pacific tree frog, western fence lizard, gopher snake, Virginia opossum, California ground squirrel, Botta's pocket gopher, house mouse, feral cat, feral dog, and coyote. Fallow agricultural fields and pasturelands are not plowed annually and may support small numbers of additional wildlife species, including the western burrowing owl, California vole, and striped skunk. Agricultural drainage ditches associated with cultivated fields are generally highly degraded, but may support wildlife such as the Pacific tree frog, western toad, and California ground squirrel.

Most of the annual grasslands within the project area have been degraded as a result of agricultural activity that has reduced the number of wildlife species that historically occurred in these habitats. Seasonally wetted areas, such as vernal pools and swales, however, occur within annual grasslands in the project area and are known to support a variety of wildlife species, including branchiopods such as fairy and tadpole shrimp, amphibians such as Pacific tree frogs and western toads, and birds including a variety of wading birds, shorebirds and waterfowl. Annual grasslands are also known to support:

- Common bird species including mourning dove, western kingbird, horned lark, cliff swallow, common raven, and northern mockingbird.
- Common reptiles such as gopher snakes and western fence post lizard.
- Common mammals including black-tailed jackrabbit, California ground squirrel, raccoon, striped skunk, and coyote.

Roadsides in the project area provide a limited amount of degraded habitat for a limited number of wildlife species also found in adjacent habitats. A few of the more common species expected along roadsides in this segment of the project area include the western fence lizard, gopher snake, ring-necked pheasant, California ground squirrel, California pocket mouse, coyote, and raccoon.

The only oak woodland identified within the Proposed Project area is found in three small stretches of the ROW in Segment 2 (Figure D.4-1). Oak woodlands in the region are known to support a diverse resident fauna including:

- Birds such as the red-tail hawk, yellow-billed magpie, western kingbird, acorn woodpecker, mourning dove, loggerhead shrike, plain titmouse, white-breasted nuthatch, house wren, lesser goldfinch, house sparrow, and house finch.
- Amphibians such as the Pacific tree frog and western toad.
- Reptiles such as the alligator lizard, western fence lizard, and gopher snake.
- Mammals including the Botta's pocket gopher, California ground squirrel, western gray squirrel, striped skunk, and black-tailed deer.

Freshwater aquatic/wetland habitats along the pipeline route are represented by seven distinct types: riparian forest, riparian scrub, freshwater marsh, vernal pool, freshwater seep, seasonal marsh, and streams and channels. These aquatic habitats are important to wildlife for the following reasons:

- Support a fairly wide diversity and abundance of wildlife.
- Provide critical breeding and foraging habitat for a number of sensitive or restricted wildlife species.
- Provide a source of fresh water for wildlife during the dry season.
- Provide food and protective cover for wildlife.
- May be used as corridors for movement and dispersal of wildlife.

Aquatic habitats such as creeks, ponds, and sloughs in the project can support:

- Amphibian species including the Pacific tree frog and western toad.
- Reptiles including the western pond turtle and common garter snake.
- Mammals including the Virginia opossum, brush rabbit, western gray squirrel, Botta's pocket gopher, California vole, coyote, raccoon, striped skunk, and black-tail deer.

Marine Biology

The Proposed Project would cross northern San Francisco Bay by connecting to an existing pipeline at the eastern end of Carquinez Strait. This section presents a brief overview of the marine resources of San Francisco Bay in general and of the project region (San Pablo Bay, Carquinez Strait, Suisun Bay) in particular.

San Francisco Estuary

The San Francisco Bay estuary, which extends from the mouth of Coyote Creek near the city of San Jose in the south to Chipps Island at the eastern end of Suisun Bay, at 1,166 square kilometers (km²) (450 square miles), is the largest coastal embayment on the Pacific Coast of the United States. San Francisco Bay is located at the mouth of the Sacramento–San Joaquin River system, which carries runoff from 40 percent of the surface area of California (Nichols et al., 1986). The deepest sections of the Bay are channels at the Golden Gate (110 m depth) and Carquinez Strait (27 m depth), whose depths are maintained by strong tidal currents. The San Francisco estuary consists of five distinct subareas: Suisun Bay, Carquinez Strait, San Pablo Bay, Central Bay, and South Bay. Each of these areas has its own characteristic biological assemblage.

San Francisco Estuary has been altered profoundly by numerous types of human perturbations. In recent years two of the factors that have most affected the biology of the estuary are reduction in freshwater flows through the Delta and the introduction of non-indigenous species through ship ballast water, hull fouling, and other mechanisms. Some of the invasions of exotic species have greatly altered habitat structure and nutrient and contaminant pathways. In addition, introduced species have contributed to reductions and extinctions of native species through predation, competition, and the introduction of parasites (San Francisco Estuary Project, 1997). The observed declines in zooplankton abundance have roughly coincided with the decline in phytoplankton, one of the main food sources for zooplankton (CALFED, 1998). The deterioration of the zooplankton community and its phytoplankton food supply in key habitat areas of the Bay-Delta is a serious problem because striped bass, delta smelt, chinook salmon, and other species that use Suisun Bay and the Delta as a nursery area feed almost exclusively on zooplankton during early life.

Over 100 species of fish have been recorded from the San Francisco Bay estuarine system (Armor and Herrgesell, 1985). These species vary in the way they use the Bay, from those that spend their entire lives in the Bay to those that spend only part of their life cycle there. In general, the fishes of the San Francisco estuary fall into four categories: true estuarine species, freshwater species, marine species, and anadromous species (Corps, EPA, BCDC, SFBRWQCB, SWRCB, 1998).

San Francisco Bay is basically a marine environment, although salinities can be appreciably diluted by freshwater during high outflow years allowing freshwater fishes to move through the Bay into the tributary streams (Moyle, 2002). Reduction in freshwater inflows from the Sacramento and San Joaquin Rivers has profoundly altered the aquatic environment of the estuary. The freshwater inflow to San Francisco Bay is less than 50 percent of historic levels (Monroe and Kelly, 1992). Diversion of water from the Sacramento–San Joaquin River system away from San Francisco Bay has had profound effects on the marine resources of the Bay, most noticeably on the anadromous fishes such as striped bass (*Morone saxatilis*) and salmon, which live part of their lives in the open ocean but depend on the rivers for spawning. Anadromous species are sensitive to a wide variety of environmental changes, including upstream alteration of spawning habitat, interference with access to spawning habitat, changes in flow patterns, and conditions in the estuary that reduce its value as a nursery site for outmigrating young (Herbold et al., 1991). The CALFED Bay-Delta Program was established by State and federal agencies in 1994 to find a long-term solution to water supply and environmental problems in the Bay and Delta (CALFED, 1998).

San Pablo Bay

San Pablo Bay lies between Central Bay and Carquinez Strait. This embayment is characterized by extensive shallow water habitat and a variable salinity regime related to fluctuating freshwater inflow from the Sacramento–San Joaquin River system with additional inflow from the Napa River, Petaluma River and Sonoma Creek (Corps, EPA, BCDC, RWQCB and SWRCB, 1998). Salinity fluctuates seasonally but rarely falls below five ppt. Except for shipping channels, San Pablo Bay is comprised of shallow mudflats with high levels of suspended fine sediments. San Pablo Bay has extensive shallow areas including vegetated marshes on its northern side and an extensive eelgrass bed on its southwestern edge.

The benthic communities of San Pablo Bay are characterized by an estuarine assemblage dominated by the Asian clam (*Potamocorbula amurensis*) and an introduced tube dwelling amphipod, *Ampelisca abdita* (Thompson et al., 2000). During times of greater freshwater influence the benthic community includes a greater number of fresh and brackish water species.

San Pablo Bay acts as a nursery area for young Dungeness crab (*Cancer magister*) and typically supports the greatest number of juvenile crabs in San Francisco estuary (Corps and Contra Costa County, 1997).

San Pablo Bay also supports several species of grass shrimp (*Crangon* spp) and red rock crab (*Cancer productus*) and brown rock crab (*Cancer antennarius*).

The fish assemblage of San Pablo Bay varies seasonally in relation to the reproductive cycles of various species and the volume of freshwater inflow (Corps, EPA, BCDC, RWQCB and SWRCB, 1998). The most abundant fish species in San Pablo Bay is northern anchovy. Other marine species such as white croaker (*Genyonemus lineatus*), jacksmelt (*Atherinopsis californiensis*), and shiner perch (*Cymatogaster aggregata*) tend to enter San Pablo Bay during the summer months when salinities are highest. Estuarine species such as starry flounder (*Platichthys stellatus*), longfin smelt, staghorn sculpin (*Leptocottus armatus*) and striped bass are most abundant in San Pablo Bay during periods of strong freshwater influence. San Pablo Bay is part of the seasonal migration corridor for anadromous fishes including striped bass, Chinook salmon, Central Valley steelhead, American shad and white and green sturgeon. These species use San Pablo Bay as seasonal habitat and/or a migration route between upstream spawning of adults or downstream migrations of juveniles (Corps, EPA, BCDC, RWQCB and SWRCB, 1998).

Carquinez Strait

The narrow, 12-mile-long Carquinez Strait joins San Pablo Bay with Suisun Bay. The Strait is characterized by deep-water habitat (mean depth 29 feet) and a variable salinity regime related to fluctuations in freshwater flow from the Sacramento–San Joaquin River system (Corps, EPA, BCDC, RWQCB and SWRCB, 1998). Strong currents move through Carquinez Strait and, as a result, most of the bottom sediments are sandy.

Benthic communities in Carquinez Strait, like those in San Pablo and Suisun Bays, are characterized by estuarine species and dominated by the Asian clam. During periods of low salinity, fresh and brackish water species become more common (Thompson et al., 2000).

Carquinez Strait is an important migratory corridor for many fish species including striped bass, Chinook salmon, American shad, Pacific herring, northern anchovy, white sturgeon and longfin smelt. During periods of strong Delta outflow, fresh and brackish water species more characteristic of Suisun Bay move downstream through Carquinez Strait into San Pablo Bay (Baxter et al., 1999). During periods of low freshwater flows marine species move up into Suisun Bay.

Suisun Bay

Suisun Bay is a shallow embayment between Chipps Island, at the western boundary of the Delta, and the Benicia-Martinez Bridge. Suisun Bay covers approximately 36 square miles, has a mean depth of 14 feet, and a mean salinity of approximately seven ppt (Corps, EPA, BCDC, RWQCB and SWRCB, 1998). Freshwater flowing from the Delta usually meets saltwater from the ocean in the vicinity of Suisun Bay. The entrapment zone of high productivity and ecological importance to many species in the estuary is usually located in Suisun Bay.

Adjacent to Suisun Bay on its northern edge is Suisun Marsh, the largest brackish marsh in the United States. The marsh is primarily a managed wetland, with levees to control water level and seasonal flooding with freshwater (CALFED, 1998). An extensive network of sloughs conveys tidal flows and some freshwater flow into the marsh. Montezuma Slough, the largest of these, is connected to Suisun Bay at its eastern and western ends. The slough is an important nursery area for many fishes, including chinook salmon, striped bass, Sacramento splittail (*Pogonichthys macrolepidotus*) and delta smelt (CALFED, 1998).

The Asian clam reaches its highest densities in Suisun Bay and has profoundly altered the ecosystem. The spring bloom no longer occurs and several native zooplankton species, important in the food web, have declined either because of the decreased foodbase or direct filtering by the Asian clam.

Suisun Bay supports a unique fish assemblage as a result of the decreased salinity and the network of sloughs along the edges. Species characteristic of Suisun Bay include longfin smelt, Delta smelt, staghorn sculpin, northern anchovy, starry flounder as well as such introduced species as striped bass, American shad, and yellowfin goby (*Acanthogobius flavimanus*). The annual success of a number of fish species is tied to the amount of low salinity water in Suisun Bay as measured by the position of the two ppt bottom salinity isohaline (Moyle, 2002). The farther downstream the isohaline, the more likely the young of freshwater and brackish water fishes to have high survival rates. Unfortunately the value of Suisun Bay as a nursery area has been compromised by not only the Asian clam but also invasions of non-indigenous copepods, amphipods, shrimp, crabs and fishes (Moyle, 2002).

Special Status Species

The analysis of special status species was based primarily on the review, verification and synthesis of information assembled by vehicular and walking surveys of the Proposed Project route conducted by the SFPP's environmental agent URS (URS, 2002) including intensive sensitive wildlife surveys of the Proposed Project and review of pertinent wildlife literature (e.g., resource databases of CNDDDB and CNPS). Special status species with the potential to occur in the project vicinity were initially identified from the following sources:

- U.S. Fish and Wildlife Service (USFWS) species lists provided for 7.5-minute USGS quadrangles in the project area.
- A search of all species occurrences in the California Natural Diversity Database (CNDDDB) within a 10-mile radius of the project area (CDFG 2002).
- The CNPS electronic inventory (CNPS, 2001).

Three levels of surveys were conducted to identify potential impacts to special status species:

- (1) Reconnaissance-level surveys.
- (2) Habitat assessments.
- (3) Focused surveys.

Reconnaissance-level surveys of the proposed pipeline route were conducted by URS during November 2001. A draft survey workplan was then developed based on these reconnaissance surveys. This workplan was submitted to the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NOAA Fisheries), the U.S. Army Corps of Engineers (USACE), and the California State Lands Commission (CSLC) on February 20, 2002. Comments on the draft survey workplan were received at a meeting with these agencies on March 5, 2002 at the U.S. Fish and Wildlife Service office in Sacramento. A final survey workplan was submitted to the agencies on March 29, 2002. The March 29, 2002 survey workplan defined the following survey methods:

- Habitat assessments were conducted for species *not* addressed by focused surveys. Examples included special status species that are already known to occur in the project area (e.g., giant garter snake and burrowing owls) or that cannot be reliably detected using practical survey methods. Focused surveys were not conducted for species that can be easily avoided or mitigated.

- Focused surveys were conducted for special status plants, vernal pool branchiopods, California red-legged frog larvae, California tiger salamander larvae, the Delta green ground beetle, valley elderberry longhorn beetle host plants, and nesting raptors, as well as general surveys to map and characterize habitats. Surveys were designed to evaluate the presence or absence of special status species and their habitats.
- Focused surveys were conducted for species or habitats if the surveys would provide useful information about the status or distribution of a species in the study area. Focused surveys were also conducted if that information would result in substantial refinement of the appropriate conservation measures.
- Focused surveys were *not* conducted in the following circumstances:
 - The presence of the species was already well-established or assumed.
 - Appropriate mitigation measures were already known or established and would not be changed by the results of focused surveys.
 - Field surveys would be ineffective at reliably determining species presence or abundance.
 - Surveys could be harmful to the species or its habitat.

Special Status Species – Wildlife and Aquatic Species

Special status wildlife are defined as species listed under the Federal and California Endangered Species Acts (FESA/CESA), State and federal species of concern, California fully protected species, and birds listed in the Migratory Bird Treaty Act.

Eighty five special status wildlife species with the potential to occur in the study area were initially identified from recent (2001 and 2002) field surveys by URS (URS, 2002), CNDDDB database records, existing reports, and a USFWS species list provided for 7.5 minute USGS quadrangles comprising the project area. These species, described in Appendix 1A, include 16 invertebrates, four amphibians, 10 fish, five reptiles, 37 birds, and 13 mammals. Special status wildlife known to occur within or near the - project (see Appendix 1) are based on known occurrences from existing literature (e.g., CNDDDB) or through direct observation (e.g., URS 2001 2002 field surveys). Identification of potential occurrences of these species was based on the presence of suitable habitat that could support a given species.

Forty-four of the 85 special status wildlife species that could occur in the project area have been determined to have greatest potential to occur. Of these special status species, however, only the following 15 species are expected to be potentially affected by the Proposed Project and are listed in Table D.4-7:

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|--|---|
| • Mid-valley fairy shrimp (<i>Branchinecta mesovallensis</i>) | • California black rail (<i>Laterallus jamaicensis coturniculus</i>) |
| • California linderiella (<i>Linderiella occidentalis</i>) | • Western burrowing owl (<i>Athene cunicularia</i>) |
| • Vernal pool fairy shrimp (<i>Branchinecta lynchi</i>) | • Saltmarsh common yellowthroat (<i>Geothlypis trichas sinuosa</i>) |
| • Vernal pool tadpole shrimp (<i>Lepidurus packardii</i>) | • Tricolored blackbird (<i>Agelaius tricolor</i>), Suisun song sparrow (<i>Melospiza melodia maxillaries</i>) |
| • Western pond turtle (<i>Clemmys marmorata marmorata</i>) | • Suisun ornate shrew (<i>Sorex ornatus sinuosus</i>) |
| • Giant garter snake (<i>Thamnophis gigas</i>), Swainson's hawk (<i>Buteo swainsoni</i>) | • Saltmarsh harvest mouse (<i>Reithrodontomys raviventris</i>) |
| • California clapper rail (<i>Rallus longirostris obsoletus</i>) | |

The Proposed Project would also cross areas federally designated as critical habitat for the vernal pool tadpole and fairy shrimp (Unit 16), and formerly designated critical habitat (Unit 11) for the California red-legged frog (all critical habitat for California red-legged frogs has been retracted by a recent federal court order). The proposed pipeline alignment would enter the formerly designated California red-legged frog at approximately MP 9.0 and leave it at approximately MP 15.2. Suitable habitat for red-legged frogs includes perennial and ephemeral streams and ponds within and in the vicinity of the proposed ROW. The proposed pipeline alignment would enter the proposed vernal pool branchiopod critical

habitat at approximately MP 24.8 and leave proposed critical habitat at approximately MP 25.3. The proposed alignment would traverse the same critical habitat units between approximately MP 28.0 and MP 40.8. Suitable habitat for listed branchiopod species includes vernal pools, swales, and seasonal wetlands throughout the eastern portion of the study area.

Individual species discussions are presented in Appendix 1A for those special status species that are known or potentially occur within the Proposed Project segments.

Special Status Species – Plants

Special status plant species are defined here as (1) all plants that are federal- or state-listed as rare, threatened or endangered, (2) all federal and state candidates for listing and species of concern, (3) all plants included in Lists 1 through 4 of the CNPS Inventory (CNPS, 2001), or (4) plants that qualify under the definition of "rare" in the California Environmental Quality Act, section 15380. A list of special status plant species documented within the region was generated from the California Natural Diversity Database (CNDDB) for occurrences within a ten-mile radius of the project, and from the California Native Plant Society electronic inventory (URS, 2002).

The potential for special status plant species to occur within the project area was determined by assessing the habitats present during reconnaissance surveys conducted in November 2001 (URS, 2002). Following this assessment, it was determined that 32 special status plant species had the potential to occur within the project area (these species are described in Appendix 1A). Focused surveys were conducted for these species by URS during the 2002 growing season according to USFWS, CDFG and CNPS guidelines (URS, 2002). The study area for these surveys included the entire construction ROW and a 50-foot-wide buffer on either side of the ROW. During these surveys, nine special status plant species were observed within, or in the vicinity of, the Study Area. Potential direct and/or indirect impacts to four of these species could occur as a result of the project, including Contra Costa goldfields (*Lasthenia conjugens*), Mason's lilaeopsis (*Lilaeopsis masonii*), Suisun marsh aster (*Aster lentus*), and hogwallow starfish (*Hesperovax caulescens*). In addition, the surveys conducted in 2002 were not appropriately timed to coincide with the peak blooming period of one species, fragrant fritillary (*Fritillaria liliaceae*), which has the potential to occur in the project area.

D.4.1.2 Environmental Setting: Proposed Project

Segment 1 (MP 0–6.1) – Contra Costa County and Carquinez Strait

Vegetation and Wetlands

Phase 1 Carquinez Strait Crossing. Vegetation types from MP 0.0-5.0 in Segment 1 are developed area, ruderal area, annual grassland, seasonal alkali marsh and brackish marsh. Upland types present within this section of Segment 1 include approximately 1.6 miles of developed area, 1.5 miles of annual grassland, and 0.5 miles of ruderal area. Wetland types along the proposed route include approximately 0.5 miles of seasonal alkali marsh and 0.4 miles of brackish marsh near the Walnut/Grayson Creek and Pacheco Creek crossings (see Appendices 1C, 1D, and 1E for information supporting wetland delineations).

One special status plant species, Mason's lilaeopsis, is known to occur in the vicinity of the project ROW east in Peyton Slough near MP 4.9. One special status plant species, fragrant fritillary, has the potential to be present in annual grassland areas in the ROW or vicinity of the ROW of Segment 1.

Two vegetation types, salt marsh and developed areas, are present between MP 5.0-6.1 in Segment 1. Approximately 0.8 miles of developed area are present at the crossing of the Carquinez Strait, and approximately 0.2 miles of salt marsh are present on each shoreline of the Carquinez Strait.

No special status plant species exist or have the potential to exist from MP 5.0-6.1 in Phase 1 of Segment 1. However, all potential special status species occurrences within this segment are summarized in Appendix 1B and discussed in detail within Appendix 1A.

Phase 2 Carquinez Strait Crossing. Vegetation types present in Phase 2 of Segment 1 are ruderal area, developed area, seasonal alkali marsh, and salt marsh. Approximately one mile of developed area at the crossing of the Carquinez Strait and 0.3 miles of ruderal area are present. Wetlands along the Phase 2 route include approximately 0.3 miles of seasonal alkali marsh and approximately 1.1 miles of salt marsh in Peyton Slough and on north side of the Carquinez Strait.

One special status plant species, Mason's lilaeopsis, is known to occur in the vicinity of the project ROW to the west in Peyton Slough near MP 4.9. One special status plant species, fragrant fritillary, has the potential to be present within both the project ROW and the vicinity of the Phase 2 ROW.

Wildlife and Aquatic Species

Phase 1 Carquinez Strait Crossing. Segment 1 of the Proposed Project ROW would cross a variety of terrestrial and aquatic wildlife habitats, the most significant being freshwater and tidal wetlands associated with the Carquinez Strait and its tributary drainages. Aquatic habitats within this segment include freshwater marsh, seasonal alkali marsh, tidal marsh, streams, channels and sloughs. The predominant terrestrial habitats in this segment are annual grassland and ruderal disturbed areas that are intermixed among developed and disturbed residential, commercial and industrial structures. Habitat types are illustrated on Figure D.4-1.

These habitats support a variety of common and special status wildlife species, including resident and migratory wading birds, shorebirds, and waterfowl; and mammals such as river otter and muskrat. Special status wildlife known or potentially occurring in Segment 1 include California linderiella, California red-legged frog, California clapper rail, black rail, salt marsh harvest mouse, and Suisun ornate shrew. Potential special status species occurrences within this segment are summarized in Appendix 1B and discussed in detail within Appendix 1A. Any of the listed species that have been found to occur in individual segments has the potential to be adversely impacted by the Proposed Project. Mitigation measures to reduce potential impacts to these species are detailed in Section D.4.3 below.

Phase 2 Carquinez Strait Crossing. The setting of Phase 2 is very similar to the Phase 1 setting. Assuming that stringing techniques for boring would be similar to those used today, the proposed future Phase 2 project would likely occur in developed areas of the Rhodia property, and extend into adjacent tidal and freshwater wetland habitats, including habitats that will be developed through Rhodia's currently planned restoration activities of Peyton Slough.

Marine Biology

Phase 1 Carquinez Strait Crossing. Between MP 0.0 and MP 5.0 the proposed pipeline would cross Walnut Creek, Grayson Creek, Pacheco Slough and Peyton Slough. Pacheco Creek receives muted tidal flows from Suisun Bay and is tidal at the point of crossing. Walnut Creek and Grayson Creek are tributaries to Pacheco Creek. The Walnut Creek and Grayson Creek crossings are approximately 4.5 miles upstream of Suisun Bay. The Pacheco Creek crossing is about 3.5 miles upstream of the Bay and is upstream of the confluence of Pacheco Creek and Grayson/Walnut Creeks. No benthic invertebrate

surveys have been done of these creeks in the vicinity of the crossings. Because of the distance from tidal influence and the dominance of freshwater flows, the benthic invertebrate community would be expected to consist of freshwater species. Fishes from Suisun Bay at times swim up these creeks as far as the crossing locations. A 1997 survey of fishes in Grayson Creek 100 meters upstream of its confluence with Walnut Creek collected eight species including common carp (*Cyprinus carpio*), Sacramento sucker (*Catostomus macrolepidotus*), mosquitofish (*Gambusia affinis*), inland silverside (*Menidia beryllina*), striped bass, pumpkinseed (*Lepomis gibbosus*), yellowfin goby and prickly sculpin (*Cottus asper*) (Leidy, 1999). With the exception of the anadromous striped bass and euryhaline yellowfin goby, these fish species are freshwater. These species probably are representative of what would be expected in Walnut and Grayson Creeks at the location of the pipeline crossings. Further upstream in Grayson Creek, a Sacramento splittail was collected during the same survey. In 1993, two Chinook salmon were collected in Walnut Creek upstream of the proposed pipeline crossing (Leidy, 1999). Therefore, sensitive fish species do swim up these creeks and might occur at the pipeline crossing locations. Appendix 1A gives a description of each of these listed anadromous fish species. In addition, the Walnut Creek system still may support steelhead (San Francisco Estuary Project, 1997). However, the creeks are channelized at the crossing locations and provide poor fish habitat at those locations (URS, 2002).

Peyton Slough is tidal and has been surveyed for marine biota. In 1990, benthic invertebrates were collected by grab samples at three locations in Peyton Slough as well as at a fourth station at the mouth of the slough (Entrix, 1991). Twenty taxa of benthic invertebrates were collected at the four stations. The most abundant species in the slough was the introduced estuarine worm *Streblospio benedicti*. The Asian clam (*Potamocorbula amurensis*) dominated the mudflat station at the mouth of the slough. The Asian clam accounted for 94 percent of the total catch in the mudflat but comprised a relatively low portion of the animals collected within the slough.

The 1990 study, also collected fishes and epibenthic invertebrates by five-foot otter trawls within Peyton Slough (Entrix, 1991). Three fish species were caught: striped bass, yellowfin goby and chameleon goby (*Tridentiger trignocephalus*). All of these are introduced species. Chameleon gobies were the most abundant fish species collected. The trawl also collected shrimp (*Crangon* spp. and *Palaemon macrodactylus*) as well as shore crab.

Earlier fish surveys were done in Peyton Slough in 1986 and 1988 (Entrix, 1991). Peyton Slough was surveyed in 1988 as part of the Shell oil spill studies. Pacific staghorn sculpin was the most abundant fish species in the 1988 otter trawls. Bay gobies (*Lepidogobius lepidus*) also were collected as well as crangonid and oriental shrimps and shore crabs. The 1986 fish surveys in Peyton Slough were dominated by Sacramento splittail and striped bass. Other fish species collected included staghorn sculpin, threespine stickleback (*Gasterosteus aculeatus*), inland silversides, and yellowfin goby.

URS (2002) reported that two Chinook salmon smolts were collected in the McNabney Marsh area, which is south of Waterfront Road and connected to Peyton Slough by tide gates, during three years of sampling between 1998 and 2001. Potential special status species occurrences within this segment are summarized in Appendix 1B and discussed in detail within Appendix 1A.

Carquinez Strait. Between 1994 and 1997, the San Francisco Estuary Institute Benthic Pilot Study sampled benthic invertebrate communities in Suisun Bay near the mouth of Pacheco Slough approximately one mile east of the point where the existing pipeline crosses Carquinez Strait (Thompson et al., 2000). The benthic invertebrates at this station either belonged to the estuarine sub-assemblage or the estuarine transition sub-assemblage depending on the amount of freshwater inflow. The estuarine assemblage is strongly dominated by the Asian clam and the introduced amphipod *Ampelisca abdita*. The

estuarine transition sub-assemblage includes both estuarine assemblage species, including the Asian clam, and fresh-brackish species such as the polychaete worm *Marenzelleria viridis*.

In 1990 Entrix took grab samples of benthic invertebrates at three transects located west of the mouth of Peyton Slough approximately 500 feet east of the point where the existing pipeline crosses Carquinez Strait (Entrix, 1991). The Asian clam was the most abundant species in the samples. The polychaete *Streblospio benedicti* and the cumacean *Leucon subnasica* were the two next most abundant species respectively.

The California Department of Fish and Game samples fishes and invertebrates by otter trawl and midwater trawl throughout San Francisco Bay (Baxter et al., 1999). Station 432 is located on the south side of Suisun Bay west of the mouth of Pacheco Creek, upstream from the existing pipeline crossing. Tables Table D.4-2, D.4-3 and D.4-4 show fishes collected at these stations since 1996. The most abundant fishes caught in otter trawls since 1996 were Pacific staghorn sculpin, striped bass, yellowfin goby, and longfin smelt (CDFG, 2003). Between 1996 and 2001, two Chinook salmon, one Delta smelt, and two Sacramento splittail were caught in otter trawls at this station. The most abundant fish species caught in midwater trawls were longfin smelt, striped bass, and northern anchovy. Between 1996 and 2001, 20 Chinook salmon, seven Delta smelt, and 25 Sacramento splittail were caught in the midwater trawls.

Table D.4-2. Total Number of Each Fish Species Collected by Otter Trawl at Station #432 from 1996 to 2001

Common Name	Fish Species	1996	1997	1998	1999	2000	2001
American shad*	<i>Alosa sapidissima</i>	0	0	1	0	0	0
arrow goby	<i>Clevelandia ios</i>	0	0	0	0	0	1
bay goby	<i>Lepidogobius lepidus</i>	1	11	0	11	0	3
bearded goby*	<i>Tridentiger barbatus</i>	0	0	1	3	14	12
California halibut	<i>Paralichthys californicus</i>	0	0	0	1	0	0
chinook salmon	<i>Oncorhynchus tshawytscha</i>	0	0	1	0	0	1
delta smelt	<i>Hypomesus transpacificus</i>	0	0	1	0	0	0
inland silverside*	<i>Menidia beryllina</i>	1	0	0	0	0	0
longfin smelt	<i>Spirinchus thaleichthys</i>	7	4	15	39	6	4
Pacific lamprey	<i>Lampetra tridentata</i>	0	0	0	0	0	2
Pacific staghorn sculpin	<i>Leptocottus armatus</i>	30	28	15	50	22	27
Pacific tomcod	<i>Microgadus proximus</i>	0	1	0	0	0	0
plainfin midshipman	<i>Porichthys notatus</i>	3	8	0	3	0	18
prickly sculpin	<i>Cottus asper</i>	0	0	3	0	0	0
river lamprey	<i>Lampetra ayresi</i>	0	2	0	1	4	1
shimofuri goby*	<i>Tridentiger bifasciatus</i>	7	1	2	1	0	0
speckled sanddab	<i>Citharichthys stigmaeus</i>	4	8	0	0	0	1
splittail	<i>Pogonichthys macrolepidotus</i>	1	0	0	0	1	0
starry flounder	<i>Platichthys stellatus</i>	4	10	6	3	0	0
striped bass*	<i>Morone saxatilis</i>	20	6	9	15	6	18
threespine stickleback	<i>Gasterosteus aculeatus</i>	1	0	1	0	0	0
white catfish*	<i>Ameiurus catus</i>	0	0	1	0	0	0
white sturgeon	<i>Acipenser transmontanus</i>	1	0	0	0	0	0
whitebait smelt	<i>Allosmerus elongatus</i>	0	0	1	0	0	0
yellowfin goby*	<i>Acanthogobius flavimanus</i>	6	3	10	19	19	9

* Introduced species.

Source: Interagency Ecological Program for the San Francisco Estuary and California Department of Fish and Game's San Francisco Bay Study.

Table D.4-3. Fish Species Collected by Midwater Trawl at Station #432 from 1996 to 2001

Common Name	Fish Species	1996	1997	1998	1999	2000	2001
American shad*	<i>Alosa sapidissima</i>	9	27	6	5	17	29
bay goby	<i>Lepidogobius lepidus</i>	0	0	0	0	0	1
bearded goby*	<i>Tridentiger barbatus</i>	0	0	0	0	2	1
chinook salmon	<i>Oncorhynchus tshawytscha</i>	4	2	2	4	2	6
common carp*	<i>Cyprinus carpio</i>	0	0	0	0	0	5
delta smelt	<i>Hypomesus transpacificus</i>	1	0	3	2	1	0
English sole	<i>Pleuronectes vetulus</i>	0	0	0	0	1	0
longfin smelt	<i>Spirinchus thaleichthys</i>	36	5	215	220	132	45
northern anchovy	<i>Engraulis mordax</i>	1	30	28	12	44	80
Pacific herring	<i>Clupea pallasii</i>	1	10	0	0	3	11
Pacific staghorn sculpin	<i>Leptocottus armatus</i>	1	2	0	4	1	3
plainfin midshipman	<i>Porichthys notatus</i>	0	1	1	1	0	0
prickly sculpin	<i>Cottus asper</i>	0	0	1	0	0	0
shimofuri goby*	<i>Tridentiger bifasciatus</i>	2	1	3	0	2	0
splittail	<i>Pogonichthys macrolepidotus</i>	11	0	5	5	4	0
starry flounder	<i>Platichthys stellatus</i>	3	3	3	0	0	0
striped bass*	<i>Morone saxatilis</i>	35	33	26	33	44	26
threadfin shad*	<i>Dorosoma petenense</i>	0	0	1	0	4	8
white croaker	<i>Genyonemus lineatus</i>	2	6	0	0	1	1
white sturgeon	<i>Acipenser transmontanus</i>	3	0	0	1	0	0
yellowfin goby*	<i>Acanthogobius flavimanus</i>	2	1	1	3	13	3

* Introduced species.

Source: Interagency Ecological Program for the San Francisco Estuary and California Department of Fish and Game's San Francisco Bay Study.

Table D.4-4 shows epibenthic invertebrates caught in otter trawls at Station 432 between 1996 and 2000. The most abundant epibenthic invertebrates were California bay shrimp and oriental shrimp. Blacktail bay shrimp, Dungeness crab, and the invasive Chinese mitten crab (*Eriocheir sinensis*) were also caught at this station.

Table D.4-4. Invertebrate Species Collected by Otter Trawl at Station #432 from 1996 to 2000

Common Name	Invertebrate Species	1996	1997	1998	1999	2000
Blacktail bay shrimp	<i>Crangon nigricauda</i>	46	40	31	0	221
California bay shrimp	<i>Crangon franciscorum</i>	15,310	28,141	44,028	12,066	12,266
Chinese mitten crab*	<i>Eriocheir sinensis</i>	0	8	19	52	28
Dungeness crab	<i>Cancer magister</i>	3	19	0	16	18
Oriental shrimp*	<i>Palaemon macrodactylus</i>	231	775	721	233	224

* Introduced species.

Source: Interagency Ecological Program for the San Francisco Estuary and California Department of Fish and Game's San Francisco Bay Study.

Entrix (1991) collected fishes and benthic invertebrates by otter trawl on the south shore of Carquinez Strait between the Benicia-Martinez Bridge and the mouth of Peyton Slough in 1990. The most abundant fish species they collected was Pacific staghorn sculpin. They also collected plainfin midshipman, yellowfin goby, starry flounder, striped bass and longfin smelt. Epibenthic invertebrates collected included crangonid and oriental shrimp. In June 1988, Entrix conducted otter trawls in the same areas and, again Pacific staghorn sculpin was the most abundant fish species (Entrix, 1991). Other fishes collected in 1988 included speckled sandab (*Citharichthys stigmaeus*), starry flounder, shiner surfperch, green sturgeon, yellowfin goby, prickly sculpin, and brown rockfish (*Sebastes auriculatus*). Epibenthic invertebrates collected in the 1988 otter trawls included Dungeness crab, shore crab, crangonid shrimp, and oriental shrimp.

The 1990 and 1988 Entrix studies also collected fishes by beach seine on the mudflats at the mouth of Peyton Slough. Table D.4-5 shows the fishes and invertebrates collected in these studies. Top-smelt (*Atherinops affinis*) and striped bass were the most abundant fishes collected in 1990. Pacific staghorn sculpin and topsmelt were the most abundant fishes collected on the mudflat in 1988. Crangonid shrimp and oriental shrimp were the most abundant epibenthic invertebrate in both surveys. Dungeness crabs were collected in 1988 but not in 1990.

On the north shore of Carquinez Strait the existing pipeline will connect with the new pipeline near Suisun Marsh. The fishes in the various sloughs of Suisun Marsh were studied by Meng, Moyle, and Herbold (1994). Their studies collected 42 species in the sloughs of Suisun Marsh. Fourteen species accounted for 98 percent of the total catch. The most abundant species included five native resident species: prickly sculpin, Sacramento sucker, Sacramento split-tail, threespine stickleback and Tule perch (*Hystero-carpus traski*); five seasonal species: Delta smelt, longfin smelt, Pacific staghorn sculpin, starry flounder, and threadfin shad (*Dorosoma petense*); and four introduced species: chameleon goby, common carp, striped bass, and yellowfin goby.

Table D.4-5. Relative Fish and Macroinvertebrate Abundance of Peyton Mudflat Collected by 50-Foot Beach Seine

Species	1988	1990
Pacific staghorn sculpin	5	0
Striped bass	2	4
Topsmelt	4	5
Starry flounder	1	0.5
Shiver surfperch	1	0
Yellowfin goby	1	3
Bay goby	2	0
Northern anchovy	1	0
White catfish	1	0
Dungeness crab	2	0
Crangoid shrimp	60	9
Oriental shrimp	1	8
Shore crab	0	0.5
Number of species	12	7
Number of individuals	81	30

Source: Entrix 1991.

Although not collected in any of the surveys reviewed here, Central valley steelhead clearly pass through Carquinez Strait and Suisun Bay on their migrations between the ocean and the Sacramento–San Joaquin River system and smolts would be expected at times to use the sloughs on either side of Carquinez Strait and Suisun Bay.

Phase 2 Carquinez Strait Crossing. The Phase 2 crossing would be located approximately 700 feet east of the Phase 1 pipeline route, near the mouth of the present location of Peyton Slough. The marine resources at that location would be similar to those described for the Phase 1 crossing.

Segment 2 (MP 6.1–17.6) – Benicia and I-680 Frontage

Vegetation and Wetlands

Vegetation types present in Segment 2 are annual grassland, oak woodland, developed areas, cultivated field, riparian scrub, riparian forest, freshwater marsh, and seasonal alkali marsh. Upland vegetation types present within Segment 2 include approximately 6.8 miles of annual grassland, 2.2 miles of disturbed developed area, 0.6 miles of oak woodland, 0.4 miles of cultivated field, and a small amount of riparian forest (0.03 miles) at Water Crossing #15 (water crossings are listed in Table B-3). Wetlands along the proposed route include approximately 1.4 miles of seasonal alkali marsh, 0.1 miles of freshwater marsh, 0.6 miles of brackish marsh, and 0.1 miles of riparian scrub. The only occurrence of freshwater seep in the project area is west of Lopes Road near MP 14.5. Segment 2 also contains fifteen

water crossings, some of which, particularly Sulphur Springs Creek, support additional wetland or riparian areas. Figure D.4-2 (on four sheets, presented at the end of Section B.4) illustrates the general wetlands types through which the pipeline route would pass, showing the large extent of wetlands in and adjacent to Segment 2.

One special status plant species, fragrant fritillary, has the potential to occur within the project ROW or vicinity of the ROW in Segment 2. Potential special status species occurrences within this segment are described within Appendix 1A and summarized in Appendix 1B.

Wildlife and Aquatic Species

Segment 2 portion of the Proposed Project ROW crosses a variety of terrestrial and aquatic wildlife habitats, the predominant ones including freshwater and tidal marshland communities associated with Carquinez Strait and Suisun Bay. Aquatic habitats within this segment include freshwater marsh, seasonal alkali marsh, tidal marsh, streams, channels, and sloughs. Predominant terrestrial habitats in this segment are annual grassland and ruderal/disturbed areas associated with developed commercial and industrial structures in East Benicia. As shown in Figure D.4-1, other terrestrial habitats in this segment include small portions of cultivated fields and oak woodlands.

The habitats within this segment support a variety of common and special status wildlife similar to those described for Segment 1. Special status species known to or potentially occurring in marsh habitat within Segment 2 include California clapper rail, black rail, salt marsh harvest mouse and Suisun ornate shrew. Other special status species in this segment include western pond turtle, Suisun song sparrow and California red-legged frog. Potential special status species occurrences within this segment are described within Appendix 1A and summarized in Appendix 1B.

Segment 3 (MP 17.6–24.5) – Cordelia

Vegetation and Wetlands

Vegetation types present in Segment 3 are annual grassland, cultivated field, developed areas, oak woodland, riparian forest, vernal pool, and seasonal alkali marsh. Upland vegetation types present within Segment 2 include approximately 2.6 miles of annual grassland, 1.4 miles of cultivated field, 0.8 miles of developed area, and 0.3 miles of ruderal area, 0.1 miles of oak woodland, and 0.1 miles of riparian forest. Wetland types along the proposed route include approximately 1.4 miles of seasonal alkali marsh and 0.7 miles of vernal pool. Segment 3 also contains ten water crossings, some of which, particularly Cordelia Slough, Suisun Creek, and Ledgewood Creek, support additional wetland or riparian areas. Figure D.4-2 illustrates the general wetlands types through which the pipeline route would pass, showing the large extent of wetlands in and adjacent to Segment 3.

One special status plant species, Suisun marsh aster, is known to exist within the project ROW at MP 19.1–19.3, and MP 23.1–23.3. Suisun marsh aster is also known to exist in the vicinity of the project ROW east of the ROW and adjacent to the ROW at MP 16.6 and MP 23.8. An additional special status plant species, Contra Costa goldfields, is known to occur in the vicinity of the project ROW north of MP 19.7–19.8 and south of the ROW at MP 22.9–23.2. A third special status plant species, fragrant fritillary, has the potential to occur within the project ROW or the vicinity of the ROW.

Wildlife and Aquatic Species

Segment 3 crosses a variety of terrestrial and aquatic wildlife habitats, including freshwater marsh habitats of Cordelia Slough, Suisun Slough, Ledge Creek, Suisun Creek, Peytonia Slough, Laurel Creek and other tributary drainages within and adjacent to the northern portion of Suisun Bay. Aquatic habitats include freshwater marsh, seasonal alkali marsh streams, channels, sloughs and riparian woodland (associated with Suisun Creek only). Predominant terrestrial habitat in this segment is annual grassland, with other terrestrial habitats including cultivated fields and ruderal/disturbed areas associated with residential and commercial portions of Fairfield (Figure D.4-1).

The habitats within this segment are known to support a variety of common and special status wildlife species, including resident and migratory wading birds, shorebirds and waterfowl. This pipeline segment skirts the edges of Suisun Bay that are largely managed for waterfowl hunting. Special status species that are known or potentially occur in marsh habitat within Segment 3 include California clapper rail, black rail, salt marsh harvest mouse and Suisun ornate shrew. Other special status species in this segment include western burrowing owl and tri-colored blackbird. Steelhead and Chinook salmon have been known to occur in some of these creeks as well. Potential special status species occurrences within this segment are summarized in Appendix 1B and are described in Appendix 1A.

Segment 4 (MP 24.5–30.7) – Fairfield/Suisun City

Vegetation and Wetlands

Vegetation types present Segment 4 are annual grassland, developed area, and ruderal area. Segment 4 contains approximately 4.0 miles of developed area, 1.8 miles of annual grassland, and 0.4 miles of ruderal area. Segment 4 also contains four water crossings, some of which, particularly Laurel Creek and the Flood Control Culvert, support additional wetland or riparian areas.

One special status plant species, Contra Costa goldfields is known to occur in the vicinity of the ROW east of MP 28.1–28.7 and east of MP 29.8–29.9. One special status plant species, fragrant fritillary, has the potential to occur in the project ROW or the vicinity of the ROW in Segment 4. Potential special status species occurrences within this segment are described within Appendix 1A and summarized in Appendix 1B.

Wildlife and Aquatic Species

Segment 4 consists almost entirely of developed and disturbed areas associated with residential and commercial portions of Fairfield and Suisun City. Other terrestrial habitats include ruderal/disturbed areas and small segments of annual grassland. Aquatic habitats in this segment include small areas of freshwater marsh associated with drainages that flow into Suisun Bay and vernal pool habitats found in annual grasslands and ruderal areas.

Disturbed habitats dominating this segment support a variety of common wildlife species adapted to disturbance, including mourning doves, rock doves, house sparrows, Brewer's blackbirds, alligator lizards, gopher snakes, Norway rats, raccoons and coyotes. Vernal pools within grassland areas in this segment support vernal pool branchiopods such as vernal pool fairy shrimp, vernal pool tadpole shrimp, and California linderiella. Ruderal/disturbed areas and annual grasslands within this segment also support nesting habitat for western burrowing owls. Potential special status species occurrences within this segment are summarized in Appendix 1B and described in Appendix 1A.

Segment 5 (MP 30.7–65.1) – Solano and Yolo Counties Agricultural Area

Vegetation and Wetlands

Vegetation types present Segment 5 are annual grassland, cultivated field, ruderal area, oak woodland, seasonal marsh, freshwater marsh, riparian scrub, riparian forest, vernal pool, brackish marsh, and vegetation associated with developed areas. Upland vegetation types present within Segment 5 include approximately 21.2 miles of cultivated field, 3.7 miles of annual grassland, 4.4 miles of ruderal area, 0.1 miles of developed area, and 0.1 miles of riparian forest. Segment 5 also contains a row of windbreak trees approximately 0.4 miles long, which are included in the oak woodland type. Wetlands along the proposed route include approximately 3.6 miles of seasonal marsh, 0.3 miles of seasonal alkali marsh, 0.5 miles of freshwater marsh, 0.3 miles of brackish marsh, 0.1 miles of vernal pool, and 0.1 miles of riparian scrub. Segment 5 also contains thirty water crossings, some of which, particularly Ulati Creek, Maine Prairie Creek, Hass Slough, Putah Creek, and the West Yolo Bypass, support additional wetland or riparian areas.

No special status plant species are known to occur within the project ROW in Segment 5. One special status plant species, hogwallow starfish, is known to occur 10 feet east of the ROW at MP 53.5–53.7. One special status plant species, fragrant fritillary, has the potential to occur in the project ROW or the vicinity of the ROW in Segment 4. Potential special status species occurrences within this segment are described within Appendix 1A and summarized in Appendix 1B.

Wildlife and Aquatic Species

Segment 5 is largely dominated by cultivated fields and annual grasslands, with occasional small areas of ruderal-herbaceous habitat. Aquatic communities include freshwater marsh associated with Ulati Creek, Hass Slough, small agricultural and ephemeral drainages, riparian woodland habitat found along Maine Prairie Creek and vernal pool habitats in annual grassland and ruderal/herbaceous areas.

The cultivated fields and annual grasslands in this segment are known to support a variety of common and special status wildlife species, including resident and migratory wading birds, shorebirds, waterfowl, raptors, gopher snakes, western fence lizards, striped skunks, raccoons, meadow voles, Botta's pocket gophers and coyotes are expected to occur in this segment. Special status species that are known to or potentially occur in Segment 5 include:

- Four vernal pool branchiopods (vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, and California linderiella). This segment is located with USFWS Proposed Critical Habitat Unit #16 for vernal pool fairy shrimp and vernal pool tadpole shrimp.
- Giant garter snakes. This species is reported from a drainage canal that parallels a portion of the ROW in this segment.
- Swainson's hawks and western burrowing owls. These species are known to breed and nest in the vicinity of the project.

Potential special status species occurrences within this segment are described within Appendix 1A and summarized in Appendix 1B.

Segment 6 (MP 65.1–69.9) – West Sacramento

Vegetation and Wetlands

Vegetation types present Segment 6 are developed area and annual grassland. Segment 6 contains approximately 3.3 miles of developed area and 1.6 miles of annual grassland. Segment 6 also contains two water crossings that support wetland or riparian areas. No special status plant species are known to occur or have potential to occur within the project ROW or in the vicinity of the ROW as listed in Appendix 1B.

Wildlife and Aquatic Species

Approximately half of Segment 6 is comprised of cultivated fields and annual grasslands. The remainder is comprised of seasonal marsh habitat in the Yolo Bypass. Aquatic habitats in this segment include freshwater marsh associated with Willow Slough and Lake Washington, seasonal marsh in the Yolo Bypass, agricultural and ephemeral drainages and riparian woodland and stream habitat associated with Putah Creek and the Toe Drain (Sacramento River).

Wildlife common to the cultivated fields and annual grasslands in this segment are similar to those described for Segment 5. During winter runoff, the Yolo Bypass often floods, attracting large concentrations of migratory waterfowl such as cinnamon teal, gadwall, American widgeon, and pintail. The ephemeral-wetted region also supports common amphibians such as the Pacific tree frog and reptiles such as the common garter snake and gopher snake. Mammals expected to use the Bypass include black-tailed deer, cottontail, raccoon, red fox and coyote. Special status species known to or potentially occurring in Segment 6 include vernal pool fairy shrimp, California linderiella, Swainson's hawks and western burrowing owls.

Segment 7 – Wickland Connection

Vegetation and Wetlands

Vegetation types present in Segment 7 are developed areas, annual grassland, and freshwater marsh. Upland vegetation types present within Segment 7 include approximately 0.4 miles of developed area and 0.4 miles of ruderal area. A small freshwater marsh (0.02 miles) is also present within the proposed segment. No special status plant species are known to occur or have the potential to occur within or in the vicinity of the project ROW, as shown in Appendix 1B.

Wildlife and Aquatic Species

Segment 7 consists of almost entirely developed and disturbed areas associated with residential, commercial, and industrial portions of West Sacramento. The only other habitat type represented in this segment is ruderal/herbaceous, which occurs in highly disturbed areas intermixed among the developed and disturbed areas.

The highly degraded habitats within this segment support a variety of common wildlife species, including Pacific tree frogs, alligator lizards, rock doves, American crows, black-billed magpies, house sparrows, purple finches, raccoons and Virginia opossum. Special status species such as Swainson's hawk and western burrowing owl occasionally forage or nest in disturbed areas similar to Segment 7, but are less likely to occur in this segment due to the level of habitat degradation and human presence. Potential special status species occurrences within this segment are described within Appendix 1A and summarized in Appendix 1B.

D.4.1.3 Environmental Setting: Existing Pipeline ROW Alternative

Vegetation and Wetlands

This section describes existing vegetation types present within the ROW for the Existing Pipeline ROW Alternative. Descriptions are based on the URS Alternatives Feasibility Report (URS, 2002) and the National Wetlands Inventory (U.S. Fish and Wildlife Service, February, 1992). Figure D.4-2 (at the end of Section D.4) illustrates the general wetlands types through which the existing pipeline ROW route would pass.

Vegetation types present within the ROW of the Existing Pipeline ROW Alternative salt marsh, brackish marsh, seasonal alkaline marsh, vernal pool, riparian forest, developed area, ruderal area, annual grassland, and cultivated field. There are approximately 49.5 miles of upland vegetation types along the Existing ROW Alternative route including 5.3 miles of developed area, 0.8 miles of riparian forest, and 8.4 miles of a mixture of ruderal area, annual grassland, and cultivated field. A 15-mile segment of native perennial grassland in the vicinity of Travis Air Force Base and Dixon includes vernal pools and seasonal marsh wetlands (URS, 2002). Wetland and riparian areas within the right-of-way of the Existing Pipeline ROW Alternative include approximately 11.1 miles of seasonal alkali marsh (including approximately ten miles in Suisun Marsh), 1.3 miles of salt marsh, and 0.4 miles of brackish marsh.

There are 32 special status plant species (see Table D.4-6 and Appendix 1A) that have the potential to occur within or in the vicinity of the right-of-way of the Existing Pipeline ROW Alternative. Most of these species occur in brackish/salt marshes, alkaline marshes, and vernal pools.

Mitigation Segment EP-1. This mitigation segment would avoid use of the Existing Pipeline ROW Alternative between MP 11 and 21 (the Suisun marsh and slough), replacing it with 16 miles of the Proposed Project route. Vegetation types present within this 16-mile mitigation segment (defined in Mitigation Measure B-5a below), developed to avoid the sensitive habitat in the Suisun slough and marshland, include developed area, annual grassland, oak woodland, cultivated field, ruderal area, freshwater marsh, alkali marsh, vernal pool, riparian scrub and riparian forest.

Upland vegetation types occurring in the Mitigation Segment EP-1 ROW include approximately 5.3 miles of developed area, 7.6 miles of annual grassland, 0.6 miles of oak woodland, 1.8 miles of cultivated field, 0.3 miles of ruderal area, 0.1 miles of riparian forest, 2.0 miles of seasonal alkali marsh, 0.1 miles of freshwater marsh, and 0.7 miles of vernal pool and 0.1 miles of riparian scrub.

Mitigation Segment EP-2. This mitigation segment is recommended in Section D.9 (Land Use). Vegetation types present within this 7.5-mile mitigation segment (Mitigation Measure LU-1d) includes annual grassland, cultivated field, developed area, and ruderal area.

Wildlife and Aquatic Species

Habitats within 500 feet of the Existing Pipeline ROW Alternative alignment include urban areas, open water, marshland, annual grassland interspersed with vernal pools, riparian habitat, agricultural areas and floodplains.

Table D.4-6. Special Status Species with the Potential to Occur Along the Existing Pipeline ROW Alternative

Common Name	Scientific Name	Listing Status ¹			Habitat
		State	Federal	CNPS	
Plants					
Suisun thistle	<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>	E	E	1B	Saltmarsh generally associated with <i>Scirpus</i> and small watercourses
soft bird's-beak	<i>Cordylanthus mollis</i> ssp. <i>mollis</i>	R	E	1B	Associated with pickleweed, salt grass, and <i>Frankenia</i>
Boggs Lake hedge-hyssop	<i>Gratiola heterosepala</i>	E		1B	Vernal pools
Contra Costa goldfields	<i>Lasthenia conjugens</i>		E	1B	Vernal pools and swales
Mason's lilaeopsis	<i>Lilaeopsis masonii</i>	R		1B	Freshwater and brackish water marsh and riparian scrub in the tidal zone
Colusa grass	<i>Neostapfia colusana</i>	E	T	1B	Large or deep vernal pools with substates of adobe mud; only known occurrences at the Jepson Prairie near Travis Air Force Base
Showy Indian clover	<i>Trifolium amoenum</i>		E	1B	Open sunny sites and swales, sometimes on serpentine soils
Solano grass	<i>Tuctoria mucronata</i>	E	E	1B	Vernal pools; only known occurrences at the Jepson Prairie near Travis Air Force Base
Invertebrates					
Conservancy fairy shrimp	<i>Branchinecta conservatio</i>		E		Vernal pools and other seasonally wet areas including depressions within railroad right-of-ways and dirt service roads
vernal pool fairy shrimp	<i>Branchinecta lynchi</i>		T		Vernal pools and other seasonally wet areas including depressions within railroad right-of-ways and dirt service roads
longhorn fairy shrimp	<i>Branchinecta longiantenna</i>		E		Vernal pools and other seasonally wet areas including depressions within railroad right-of-ways and dirt service roads
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>		T		Riparian habitat; only found in association with elderberry shrubs (<i>Sambucus</i> sp.)
Delta green ground beetle	<i>Elaphrus viridis</i>		T		Vernal pools; only known population is at the Jepson Prairie near Travis Air Force Base
vernal pool tadpole shrimp	<i>Lepidurus packardii</i>		E		Vernal pools and other seasonally wet areas including depressions within railroad right-of-ways and dirt service roads
Reptiles					
giant garter snake	<i>Thamnophis gigas</i>	T	T		Slow moving watercourses generally where there is open habitat and debris piles for sunning
Mammals					
salt marsh harvest mouse	<i>Reithrodontomys raviventris</i>	E, FP	E		Saltmarsh with pickleweed, alkali heath, and other middle marsh plant associates generally where habitat above higher high water is present
Birds					
Western burrowing owl	<i>Athene cunicularia</i>	SC			Grasslands where there are ground squirrel burrows for nesting and little overstory vegetation; also uses culverts and human-made debris piles
California clapper rail	<i>Rallus longirostris obsoletus</i>	E, FP	E		Nests in saltmarsh generally dominated by cordgrass

Common Name	Scientific Name	Listing Status ¹			Habitat
		State	Federal	CNPS	
California black rail	<i>Laterallus jamaicensis coturniculus</i>	T, FP			Nests in brackish water marsh and saltmarsh that generally includes areas above higher high water
Swainson's hawk	<i>Buteo swainsoni</i>	T			Nests in large trees often associated with riparian areas that are near suitable agricultural foraging habitat; large nesting population around Davis
Fish					
Delta smelt	<i>Hypomesus transpacificus</i>	T	T		Slow moving freshwater and brackish water sloughs and streams in the Delta and Sacramento Valley
Steelhead – Central Valley ESU	<i>Oncorhynchus mykiss</i>		T		May occupy tidal marshes and any perennial tributary to SF Bay or the Sacramento River
Chinook Salmon- Spring Run	<i>Oncorhynchus tshawytscha</i>	T	T		May occupy tidal marshes and any perennial tributary to SF Bay or the Sacramento River
Chinook Salmon- Winter Run	<i>Oncorhynchus tshawytscha</i>	E	E		May occupy tidal marshes and any perennial tributary to SF Bay or the Sacramento River
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>		T		Slow moving freshwater and brackish water sloughs and streams in the Delta and Sacramento Valley
Amphibians					
California tiger salamander	<i>Ambystoma californiense</i>		C		Breeds in vernal pools, stockponds, and slow moving streams; often aestivates in grasslands within ground squirrel burrows
California red-legged frog	<i>Rana aurora draytonii</i>		T		Breeds and over-summers in slow moving water-courses, stockponds, and seasonal wetlands with deep pools and emergent vegetation; aestivate in upland areas within ground squirrel burrows

¹ Federal Status Codes:

- E = Endangered. Species in danger of extinction throughout all or a significant portion of its range.
- T = Threatened. Species likely to become endangered within the foreseeable future.
- PE = Proposed for listing as endangered.
- PT = Proposed for listing as threatened.
- PD = Proposed for delisting.
- C = Candidate for listing.
- SC = USFWS Species of Concern (an informal designation)

California Status Codes:

- E = Endangered. Species whose continued existence in California is in jeopardy
- T = Threatened. Species likely to become endangered within the foreseeable future.
- R = Rare. Plant species, although not presently threatened with extinction that may become endangered in the foreseeable future.
- FP = Fully protected under the California Fish and Game Code
- SC = Species of Special Concern

California Native Plant Society Status Codes (CNPS 2001):

- 1A = Plants presumed extinct in California
- 1B = Plants that are rare, threatened or endangered in California and elsewhere.
- 2 = Plants that are rare, threatened or endangered in California, but more common elsewhere.
- 3 = Plants about which more information is needed.
- 4 = Plants of limited distribution

North of Concord and Martinez, the Existing Pipeline Alternative runs adjacent to approximately 0.5 miles of tidal wetlands along the south shore of the Carquinez Strait-an approximately 5,000-foot-wide channel that carries flows from the Sacramento and San Joaquin Rivers into San Francisco Bay. North of the Carquinez Strait, the Existing Pipeline Alternative crosses approximately 10 miles of tidal and diked wetlands (Suisun Marsh) associated with the margins of Suisun Bay. Suisun Marsh is the largest managed marsh in the San Francisco Estuary. These wetlands are managed primarily to provide winter feeding and resting habitat for migratory waterfowl. The majority of the habitat within the marsh is diked and managed by duck clubs and the State wildlife refuge system. Small areas of salt and brackish water tidal wetlands and tidal flats border the major slough channels of the marsh and open waters of Suisun Bay. The CDFG has designated Suisun Marsh as a Significant Natural Area due to the number of rare species that it supports.

Several threatened plant and wildlife species are known to use open water and/or tidal marsh associated with the Carquinez Strait, as well as tidal and diked marshes within Suisun Marsh (see Table D.4-5). Many of the known populations of Suisun thistle and soft-bird's beak occur within Suisun Marsh and the smaller marshes along the Martinez shoreline. Suisun Marsh supports some of the largest nesting populations of California clapper rail, California black rail and salt marsh harvest mouse within the San Francisco Estuary system. Runs of anadromous steelhead and Chinook salmon must pass through the Carquinez Strait en route to and from their spawning grounds in Central Valley Rivers. The USFWS has designated all river reaches accessible to listed steelhead in the Sacramento and San Joaquin rivers and their tributaries as critical habitat for this species. Delta smelt and Sacramento splittail also occur year-round within the Carquinez Strait, as well as in slough channels in Suisun Marsh, along the Martinez shoreline and within the Delta.

Northwest of Suisun Marsh and the City of Fairfield, the Existing Pipeline ROW Alternative passes through approximately 15 miles of native grassland in the vicinity of Travis Air Force Base and Dixon. Native perennial grasses may occur as remnant stands or as inclusions in relatively undisturbed portions of upland vegetation types such as annual grassland and oak woodland. Native perennial grassland may also occur on the fringes of wetlands including freshwater and brackish marsh and on upland mounds associated with vernal pools. This vegetation type may occur where grazing or mechanical impacts, including disking, plowing and leveling have been relatively minor and allowed persistence of perennials. Typical species include purple needlegrass (*Nassella pulchra*), creeping wildrye (*Leymus triticoides*), blue wildrye (*Elymus glaucus*), and salt grass (*Distichlis spicata*).

This region has generally retained its historic topography, as it has never been graded for cultivation. These grasslands are lightly undulating, with areas of shallow depressions dominated by annual plants and little shrub or tree cover. Many of the soils underlying this habitat type have an impermeable hardpan layer of clay and/or iron-silica that reduces percolation of winter rains and results in the development of seasonal ponds or vernal pools within the shallow depressions. Several species of plants, amphibians and invertebrates utilize this temporary water source. Vernal pools are said to support some of the greatest numbers of endemic and rare species found within any California habitat. The CDFG has designated the southern portion of this region around the Travis Air Force Base as a Significant Natural Area due to the abundance of sensitive species and natural habitats that it supports.

Special status plants that occur within close proximity to the Existing Pipeline ROW Alternative in the region between Travis Air Force Base and Dixon include Contra Costa goldfields and showy Indian clover. Invertebrates, including several species of fairy and vernal pool tadpole shrimp, are known to occur within vernal pools adjacent to this alternative. These listed branchiopods are likely to be present within isolated pools found within the railroad ROW where native soil and some of the historic topography is still present. The western burrowing owl, a high profile State species of concern, is likely to nest and winter in grasslands surrounding the alternative and along the railroad berms that provide elevated perches and mammal burrows suitable for occupation by nesting owls.

Habitat along the remaining 20 miles of the Existing Pipeline Alternative in eastern Solano and Yolo Counties is in agricultural production and managed for flood control purposes. The Yolo Bypass west of the Sacramento River was historically part of a natural flood basin that filled with seasonal waters for several months of the year. Currently, the area is managed with a series of levees and water control structures to collect floodwaters from the Sacramento Valley between early fall and spring. The Yolo Bypass and agricultural lands surrounding Davis support the largest population of nesting Swainson's hawks in the Central Valley. This area contains riparian habitat and large tree stands adjacent to agricultural lands that provide suitable

nesting and foraging habitat for Swainson's hawks. CDFG has designated the Davis area as a Significant Natural Area primarily due to the number of nesting Swainson's hawks that occupy this region.

D.4.1.4 Environmental Setting: No Project Alternative

The No Project Alternative would occur in the same area as the Existing Pipeline ROW Alternative (see Section D.4.1.3).

D.4.2 Applicable Regulations, Plans, and Standards

Applicable regulations include federal, state and local regulations that address the protection of special status plant species and sensitive vegetation types, (including wetlands, riparian plant communities, and trees). Although CEQA indirectly regulates biological resources, it is not specific to these resources and is addressed elsewhere in this document.

D.4.2.1 Federal

Endangered Species Act of 1973 (16 USC 1531 et seq.). The Federal Endangered Species Act of 1973, and Title 16 (implementing regulations) of the United States Code of Regulations (CFR) 17.1 et seq., designate and provide for protection of threatened and endangered plants and animals and their critical habitat. Procedures for addressing federal-listed species follow two principal pathways, both of which require consultation with the USFWS, which administers the act for terrestrial and aquatic species. NOAA Fisheries administers the act for anadromous fish and marine species. The first pathway is set up for situations where a non-federal government entity must resolve potential adverse impacts to species protected under Section 10 of the Act. The second pathway is spelled out under Section 7 of the Act and involves projects with federal connection or requirement; typically these are projects where a federal lead agency is sponsoring or permitting the Proposed Project. In these instances, the federal lead agency initiates and coordinates the following steps:

- Informal consultation with USFWS and NOAA Fisheries to establish a list of target species.
- Preparation of biological assessment assessing potential for the project to adversely affect listed species.
- Coordination between state and federal biological resource agencies to assess impacts.
- Formal consultation with USFWS and/or NOAA Fisheries for projects that may directly and indirectly affect listed species.
- Development of appropriate measures to lessen adverse effects to federally listed species.

The USFWS ultimately issues a final opinion on whether the project will affect the federally listed species. A Section 10(a) Endangered Species Incidental Take Permit may be necessary when the "taking" of a species is incidental to the lawful operation of a project.

Under section 7(a)(2) of the Endangered Species Act, the USFWS must, in most cases, officially designate specific areas as critical habitat for a threatened or endangered species. Federal agencies must then insure that any action they authorize, fund, or carry out is not likely to result in habitat destruction or adverse modification of the designated areas.

The USFWS proposed critical habitat for several vernal pool species on September 24, 2002 (Federal Register Vol. 67, No. 185). The proposed pipeline falls within Units 4, 5A, and/or 5B (all in southern Solano County) of the proposed critical habitat for Contra Costa goldfields (*Lasthenia conjugens*). The proposed pipeline alignment is possibly within or immediately east of Units 1 and/or 2 of the proposed critical habitat for Colusa grass (*Neostapfia colusana*) and Solano grass (*Tuctoria mucronata*) (in southeastern Yolo County and central Solano County, respectively). The Proposed Project would also

cross areas of formerly designated critical habitat (Unit 11) for the California red-legged frog (all critical habitat for California red-legged frogs has been retracted by a recent federal court order). The proposed pipeline alignment would enter the formerly designated California red-legged frog at approximately MP 9.0 and leave it at approximately MP 15.2. Suitable habitat for red-legged frogs includes perennial and ephemeral streams and ponds within and in the vicinity of the proposed ROW.

Federal Clean Water Act. Section 404 of the Clean Water Act prohibits the discharge of dredged or fill material into “waters of the United States” without a permit from the U.S. Army Corps of Engineers. The definition of waters of the United States includes wetland areas “that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3 7b). The U.S. Environmental Protection Agency (U.S. EPA) also has authority over wetlands and may override a Corps permit. Substantial impacts to wetlands may require an individual permit. Projects that only minimally affect wetlands may be eligible for one of the Nationwide Permits that require less review than an individual permit.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) implements international treaties between the United States and other nations devised to protect migratory birds, any of their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. As authorized by the Migratory Bird Treaty Act, the U.S. Fish and Wildlife Service issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits can be found in 50 CFR part 13 General Permit Procedures and 50 CFR part 21 Migratory Bird Permits. The State of California has incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the California Department of Fish and Game (CDFG) Code.

D.4.2.2 State

California Environmental Quality Act (CEQA) of 1970 (Public Resources Code Section 21000-21177; Guidelines at Section 15000 et seq.). Establishes requirements and procedures for State and local-agency review of the environmental effects of projects proposed within their jurisdictions. CEQA requires the preparation of an Environmental Impact Report (EIR) for projects that may significantly affect the environment. CEQA Guidelines stipulate that a plant or animal that is not listed but can be shown to meet criteria for listing under the Endangered Species Act (see below) shall be given the same consideration as a listed species.

California Endangered Species Act. Sections 2050 through 2098 of the California Fish and Game Code outline the protection provided to California’s rare, endangered, and threatened species. Section 2080 of the California Fish and Game Code prohibits the taking of plants and animals listed under the authority of the California Endangered Species Act of 1984.

Native Plant Protection Act of 1977. Native Plant Protection Act of 1977, Fish and Game Code Section 1900 et seq., gives the California Department of Fish and Game authority to designate state Endangered, Threatened, and Rare plants and provides specific protection measures for identified populations.

Sensitive species that would qualify for listing but are not currently listed are afforded protection under CEQA. Guidelines for Implementation of the California Environmental Quality Act of 1970 (CEQA

Guidelines), Title 14, CCR Section 15065 (“Mandatory Findings of Significance”) requires that a reduction in numbers of a rare or endangered species be considered a significant effect. Section 15380 (“Rare or endangered species”) provides definitions and provides for assessment of unlisted species as rare or endangered under CEQA if the species can be shown to meet the criteria for listing. Unlisted plant species on the California Native Plant Society’s Lists 1A, 1B, and 2 would typically be considered under CEQA.

California Streambed Alteration Notification/Agreement. Sections 1601-1606 of the California Fish and Game Code require that a Streambed Alteration Application be submitted to the CDFG for “any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake”. The removal of vegetation along a stream may also be regulated by the Department. The Department reviews the proposed actions and, if necessary, submits to the Applicant a proposal for measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by the Department and the Applicant is the Streambed Alteration Agreement. Often, projects that require a Streambed Alteration Agreement also require a permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. In these instances, the conditions of the Section 404 permit and the Streambed Alteration Agreement may overlap.

Section 1603 requires that private entities obtain a Streambed Alteration Agreement from the Department of Fish and Game prior to undertaking any construction activity within streambeds, including all intermittent as well as perennial streams. Section 1601 imposes similar requirements on State and local government agencies. Through this agreement the Department attempts to ensure that any approved construction activity is protective of stream resources through design, construction planning, and specific mitigation measures.

Section 401 Water Quality Certification. Section 401 of the Clean Water Act grants each state the right to ensure that the State's interests are protected on any federally permitted activity occurring in or adjacent to Waters of the State. In California, the Regional Water Quality Control Boards are the agency mandated to ensure protection of the State's waters. If a proposed project requires a U.S. Army Corps of Engineers CWA Section 404 permit, falls under other federal jurisdiction, and has the potential to impact Waters of the State, the Regional Water Quality Control Board will regulate the project and associated activities through a Water Quality Certification determination (Section 401), which verifies that the project activities will comply with state water quality standards. If a proposed project does not require a federal permit, but does involve dredge or fill activities that may result in a discharge to "Waters of the State", the Regional Board has the option to regulate the project under its state authority (Porter-Cologne) in the form of Waste Discharge Requirements or Waiver of Waste Discharge Requirements.

California Fish and Game Code. Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code outline protection for fully-protected species of mammals, birds, reptiles and amphibians, and fish. Species that are fully protected by these Sections may not be taken or possessed at any time. The Department cannot issue permits or licenses that authorize the “take” of any fully protected species, except under certain circumstances such as scientific research and live capture and relocation of such species pursuant to a permit for the protection of livestock. Specific sections of the California Fish and Game Code pertinent to the current project include:

- Section 3503 (which prohibits the taking, possession, or needless destruction of the nest or eggs of any bird).
- Section 3503.5 (which prohibits the taking, possession, or destruction of any bird in the order Falconiformes or Strigiformes [birds-of-prey] or the taking, possession, or destruction of the nest or eggs of any such bird).

- Section 3513 (which prohibits the taking or possession of any migratory non-game bird as designated in the Migratory Bird Treaty Act).

D.4.2.3 Regional and Local

Suisun Resource Conservation District. Resource Conservation Districts are authorized under the California Public Resource Code to assist the State in soil and water conservation by giving assistance to landowners and municipalities to control soil erosion and runoff, stabilize soils, and improve water quality. In 1963, local landowners in the Suisun Marsh formed the Suisun Resource Conservation District (SRCD) to protect the environmental quality of the marsh. SRCD performs both administrative and technical functions that include representing the interests of the landowners. The District includes 116,000 acres, consisting of approximately 52,000 acres of managed wetlands, 6,300 acres of unmanaged tidal wetlands, 30,000 acres of bays and sloughs, and 27,700 acres of upland grasslands.

San Francisco Bay Conservation and Development Commission. The San Francisco Bay Conservation and Development Commission (BCDC) is charged with regulating all filling and dredging in San Francisco Bay (which includes San Pablo and Suisun Bays, sloughs and certain creeks and tributaries that are part of the Bay system, salt ponds and certain other areas that have been diked-off from the Bay). BCDC also protects the Suisun Marsh, the largest remaining wetland in California, by administering the Suisun Marsh Preservation Act in cooperation with local governments and regulating new development within the first 100 feet inland from the Bay to ensure that maximum feasible public access to the Bay is provided

Local Tree Ordinances. The Contra Costa County Tree Ordinance Chapter 816 (Contra Costa County, 2002), the Yolo County Tree Ordinance Section 10-2 (Yolo County, 2002), the City of West Sacramento Tree Preservation Requirements Chapter 8.24 (City of West Sacramento Municipal Code), and the City of Fairfield Tree Ordinance Section 21.2 (The Code of the City of Fairfield, California, 1960) establish standards for maintenance, management, and preservation of native and indigenous trees.

Yolo County Habitat Conservation Plan. Yolo County published a Preliminary Draft Habitat Conservation Plan entitled “A Plan to Mitigate Biological Impacts from Urban Development in Yolo County” in January of 2001. The proposed pipeline would pass through the portion of Yolo County covered by this plan, however, the Proposed Project would not conflict with the Plan because it is still in draft form so it is not legally binding. The Plan defines “urban development” as those projects requiring discretionary action on the part of participating jurisdictions and which are also subject to environmental review under CEQA. Goals of the Plan are to establish a conservation program to mitigate impacts of already planned development on 7 plant and 19 animal species, and to maintain existing agricultural values on those lands where conservation activities may occur under the Plan. Of these covered species the Proposed Project has the potential to impact the Swainson’s hawk, tricolored blackbird, western burrowing owl, giant garter snake, mid-valley fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp.

County General Plans. Yolo, Solano, and Contra Costa Counties all have General Plans with elements that include Land Use, Open Space, and Conservation. The conservation aspects of these plans address biological resources. Yolo County published “Yolo County General Plan, Part I: The Plan” in July 1983. Solano County prepared a General Plan in 1967 and has updated portions of this plan by element and by geographic region more recently. Contra Costa published “Contra Costa County General Plan 1995-2010” in July 1996.

D.4.3 Environmental Impacts and Mitigation Measures for the Proposed Project

D.4.3.1 Introduction

This section assesses environmental impacts and proposes mitigation measures related to biological resources for the Proposed Project and Alternatives. First, Section D.4.3.2 provides an overview of the definition and use of significance criteria related to biological resources. Subsequently, the section defines impact classes and identifies impacts, assigns a level of significance to each, and proposes specific measures that should be taken to avoid or minimize significant impacts on vegetation and wetlands, wildlife, and marine and aquatic biological resources.

D.4.3.2 Definition and Use of Significance Criteria

Significance criteria for impacts to biological resources are based on §15065 and Appendix G of the CEQA Guidelines and §21083 of the Public Resources Code. The following provides significance criteria as defined by the CSLC.

Significance Criteria for Vegetation

Adverse impact on vegetation would be considered significant and would require additional mitigation if project construction or operation would:

- Disturb a substantial portion of the vegetation type within a local region to the point where natural or enhanced regeneration could not restore this vegetation to its pre-construction condition within three years.
- Result in a long-term reduction or alteration of unique, rare, or special concern vegetation types (*e.g.*, riparian vegetation) or natural communities.
- Introduce new, or expand the range of existing non-native plants, noxious weed species or soil pests.
- Create substantial barriers for dispersal of native plant species.
- Result in a spill or leak that would result in contaminated soil that would eradicate the existing vegetation, inhibit revegetation, and/or migrate to other areas and impact the soil and water ecology via erosion and sedimentation.

Significance Criteria for Wetlands

Adverse impact on wetlands would be considered significant and would require additional mitigation if project construction or operation would:

- Fill or alter a wetland or vernal pool, resulting in a long-term adverse change in its hydrology, soils, or composition of vegetation or unique, rare, or special concern wetland community.
- Remove or significantly prune overstory tree species in a manner that affects wetland functions related to bank stabilization, stream temperature, insect habitat, etc.
- Cause short- or long-term violations of Federal or state water quality standards for streams that lead to wetlands measured as in-stream elevated turbidity readings or decreased dissolved oxygen levels.

Significance Criteria for Wildlife, Aquatic Species, and Marine Biology

Adverse impact on wildlife and aquatic resources would be considered significant and would require additional mitigation if project construction or operation would:

- Change the diversity or substantially alter the numbers of a local population of any wildlife or aquatic species, or interfere with their survival, or growth to a degree that would adversely affect wildlife or aquatic populations.
- Substantially interfere with the movement or range of migratory birds and other wildlife, or the movement, range, or spawning of any resident or anadromous fish.
- Result in a substantial long-term loss or deterioration of existing wildlife or aquatic habitat.
- Introduce new invasive wildlife or aquatic species to an area.
- Create a potential health hazard or involve the use, production, or disposal of materials in a manner that would be expected to pose a hazard to wildlife or fish populations in the project area.

Significance criteria were applied to wildlife species populations and habitats within or near the proposed pipeline corridor to evaluate potential impacts associated with the construction and operation of the Proposed Project. An example of a significant impact is substantial disturbance to or removal of a special status species nest or burrow (e.g., burrowing owl, tricolored blackbird, and northern harrier). Impacts to less sensitive wildlife species or habitat (i.e., habitat that does not contain wildlife concentration areas or critical resources) would be considered adverse but less than significant. Examples include temporary removal of disturbed annual grassland areas and cultivated agricultural lands that are widely distributed in the vicinity of the project that may be used by some species, but don't provide critical wildlife habitat.

Significance Criteria for Special Status Species

Adverse impact on federally or state-listed or other special status species would be considered significant and would require additional mitigation if project construction or operation would:

- Reduce the abundance of sensitive species, including species under the protection of the Migratory Bird Treaty Act, that occur within the project area.
- Result in the loss of designated or proposed critical habitat for one or more listed species.
- Cause a temporary alteration or loss of habitat important for one or more listed species that could result in avoidance by a listed species, or that could cause increased mortality or lowered reproductive success.
- Result in direct or indirect impacts on candidate or sensitive species populations or habitat, that would contribute to or result in the Federal or State listing of the species, (e.g., by substantially reducing species numbers, or by resulting in the permanent loss of habitat essential for the continued existence of a species).
- Create a potential health hazard or involve the use, production, or disposal of materials that pose a hazard to special status species populations in the project area.

Summary of Biological Resources Impacts and Mitigation Measures

Impacts to biological resources are addressed in several categories: vegetation and wetlands, wildlife, marine and aquatic biology, and special status species. Table D.4-7 lists the special status species potentially impacted within the project area segments.

Table D.4-8 lists all impacts and mitigation measures that are presented in the following sections.

Table D.4-7. Special Status Species Potentially Impacted within Proposed Project Segments

Special Status Species	Project Segments							Specific Location(s)/Source(s)
	1	2	3	4	5	6	7	
Plants								
Contra Costa goldfields <i>Lasthenia conjugens</i>			x	x				Known to occur north of ROW at MP 19.7–19.8, south of the ROW at MP 22.9–23.2, and east of the ROW at MP 28.1–28.7 and MP 29.8–29.9
Mason's lilaeopsis <i>Lilaeopsis masonii</i>	x							Known to occur in the Peyton Slough area near MP 4.9
Suisun Marsh aster <i>Aster lentus</i>			x					Known to occur east of ROW at MP 16.6, at MP 19.1–19.3, at MP 23.1–23.3, and adjacent to ROW at MP 23.8
Fragrant fritillary <i>Fritillaria liliacea</i>	x	x	x	x	x	x		Surveys were not appropriately timed (see individual segment discussions)
Hogwallow starfish <i>Hesperevax caulescens</i>					x			Known to occur east of the ROW at MP 53.5-53.7
Wildlife								
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>				x	x	x		Detected at 19 study sites (URS, 2002). These sites occur in four general locations including MP 26.9, MP 36.8 –37.2, MP 42.4–48.7, MP 51.4–53.7.
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>				x	x			Detected at 12 study sites (URS, 2002). These sites occur in two general locations from MP 29.3–29.4 (intersection of Walters Rd. and Airbase Pkwy., Fairfield) and from MP 52.5–53.7.
Mid-valley fairy shrimp <i>Branchinecta mesovallensis</i>					x			Mid-valley fairy shrimp were detected at seven locations (URS, 2002) which occur in two general locations from MP 36.8–37.2 and from MP 52.5–53.7
California linderiella <i>Linderiella occidentalis</i>	x			x	x	x		California linderiella was detected at 111 sites throughout the segments (URS, 2002). These observations include those at: MP 1.4, a group of survey sites between Davis and West Sacramento (approximately where Interstate 80 meets the western side of the Yolo Bypass), a group of five sample sites located along the Union Pacific Railroad grade (in the City of Fairfield), MP 29.0–29.4, a cluster of sites located between Robben and Main Prairie Roads, south of Hass Slough, pipeline route to the northeast to its intersection with King Road.
California red-legged frog <i>Rana aurora draytonii</i>	x	x						Streams at MP 9.8, MP 13.9 (URS), MP 14.9 (CNDDB), MP 15.5 (URS), and ponds near MP 9.8 (URS), MP 10.7 (URS), MP 15.5– 6.0 (CNDDB), MP 16.5 (URS), MP 16.6 (CNDDB), MP 17.4 (CNDDB).
California red-legged frog <i>Rana aurora draytonii</i>	x	x						MP 9.0–15.2 (former USFWS designated critical habitat area).
Giant garter snake <i>Thamnophis gigas</i>					x			Documented from one location within an irrigation canal less than one mile from the pipeline ROW at MP 46.2. Pipeline parallels this canal for approximately 1.5 miles. Water crossing at MP 45.7 considered potential habitat due to its proximity to the crossing mentioned above (near MP 46.2).
Western pond turtle <i>Clemmy's marmorata marmorata</i>		x						MP 14.4 (URS) Observed in a stock pond approximately 600 feet west of MP 14.4.
California black rail <i>Laterallus jamaicensis coturniculus</i>	x	x	x					MP 4.3–4.9 (URS, 2002), MP 22.9–24.0, MP 26.0 (CNDDB), 0.5-mile east of the alignment at MP 9.3 (CNDDB).
California clapper rail <i>Rallus longirostris obsoletus</i>	x	x	x					Approximately MP 4.3-4.7 (project area between I-680 and Pacheco Slough) and Suisun Bay near Peytonia Slough and Suisun Slough North considered Essential Habitat Areas supporting the clapper rail (USFWS, 1984).
Swainson's hawk <i>Buteo swansonii</i>					x	x		Ten Swainson's hawk nest locations have been documented within 0.5 miles of the ROW (URS, 2002 and CDFG, 2002). Nine of these occurrences are located in Yolo County between MP 57.7 and 69.8. The tenth is north of MP 34.7. Seven of the nine locations that are within 0.5 miles of the ROW are within 0.25 miles of the ROW (CDFG disturbance guideline specifies 0.25 miles as the disturbance threshold).
Western burrowing owl <i>Athene cunicularia</i>			x	x	x	x		Documented at MP 22.7–23.1 (CNDDB), MP 31.3 (URS, 2002), MP 37.1–37.2 (CNDDB), MP 42.7 (CNDDB), MP 44.8–45.4 (CNDDB, URS), MP 46.3–46.7 (CNDDB), MP 47.2 (CNDDB), MP 47.7 (URS), MP 48.6–49.0 (CNDDB, URS), MP 50.3 (CNDDB), MP 52.7–52.9 (URS), MP 53.7 (CNDDB), MP 54.8–55.6 (CNDDB).
Suisun song sparrow <i>Melospiza melodia maxillaris</i>		x						MP 6.4–6.9 (CNDDB).

Special Status Species	Project Segments							Specific Location(s)/Source(s)
	1	2	3	4	5	6	7	
Tricolored blackbird <i>Agelaius tricolor</i>			X					MP 18.0 (URS)
Salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	X	X	X					MP 1.5–1.6 (URS), MP 2.1 - 2.6 (CNDDDB), MP 3.3 (CNDDDB), MP 3.7–4.9 (CNDDDB), MP 6.4–6.9 (URS), MP 7.3–7.9 (CNDDDB), MP 8.5–9.3 (CNDDDB), MP 11.8 (CNDDDB), MP 16.5 (CNDDDB), MP 19.1–19.7 (URS), MP 23.8–24.5 (URS), MP 24.0–24.3 (CNDDDB).
Suisun ornate shrew <i>Sorex ornatus sinuosus</i>	X	X	X					MP 1.5–4.9 (URS), MP 6.1–20.0 (URS).
Fish								
Sacramento Splittail <i>Pogonichthys macrolepidotus</i>	X							Walnut Creek (MP 0.3), Grayson Creek (MP 0.3), Peyton Slough (MP 4.0), Carquinez Strait (MP 5.1 to MP 6.4), Sulphur Springs Creek (MP 6.8), Goodyear Slough (MP 7), and Yolo Bypass (65.2)
Central Valley steelhead <i>Oncorhynchus mykiss</i>	X							Walnut Creek (MP 0.3), Grayson Creek (MP 0.3), Peyton Slough (MP 4.0), and Carquinez Strait (MP 5.1 to MP 6.4)
Sacramento River Winter-Run Chinook Salmon <i>Oncorhynchus tshawytscha</i>	X							Walnut Creek (MP 0.3), Grayson Creek (MP 0.3), Peyton Slough (MP 4.0), and Carquinez Strait (MP 5.1 to MP 6.4)
Central Valley Spring-Run Chinook Salmon <i>Oncorhynchus tshawytscha</i>	X							Walnut Creek (MP 0.3), Grayson Creek (MP 0.3), Peyton Slough (MP 4.0), and Carquinez Strait (MP 5.1 to MP 6.4)
Central Valley Fall/Late-Fall Chinook Salmon <i>Oncorhynchus tshawytscha</i>	X							Walnut Creek (MP 0.3), Grayson Creek (MP 0.3), Peyton Slough (MP 4.0), and Carquinez Strait (MP 5.1 to MP 6.4), Cordelia Slough (MP 19.2), Suisun Creek (20.5), and South Fork Putah Creek (57.8)
Delta Smelt <i>Hypomesus transpacificus</i>	X							Carquinez Strait (MP 5.1 to MP 6.4)
Green sturgeon <i>Acipenser medirostris</i>	X							Carquinez Strait (MP 5.1 to MP 6.4)
Longfin smelt <i>Spirinchus thaleichthys</i>	X							Carquinez Strait (MP 5.1 to MP 6.4)

Notes:

MP = mileposts which were determined based on the May 2002 Concord to Sacramento Route Maps prepared by SPEC Services (300 Series)

CNDDDB = California Natural Diversity Database occurrences

URS = Occurrences determined during the URS 2001-2002 studies

D.4.3.3 Impacts of Pipeline Construction

In this section, impacts and mitigation measures are presented for vegetation and wetlands, wildlife, and marine/aquatic biology. Section D.4.3.6 describes impacts by segment.

Vegetation and Wetlands

Impacts to special status plant species, upland vegetation types, wetlands, and creeks and channels due to pipeline construction activities are described below, along with any associated mitigation measures.

Impact BB-1: Construction Causing Sedimentation, Erosion, or Contamination Affecting Special Status Plant Species or Wetlands

Erosion of clean and/or contaminated soils exposed during trenching or from deposition of hazardous substances could cause habitat degradation to sensitive plant species or within wetlands. (Potentially Significant, Class II)

Table D.4-8. Summary of Biological Resources Impacts and Mitigation Measures

Impact	Mitigation Measure
Construction Impacts: Proposed Project & Existing Pipeline ROW	
BB-1: Construction Causing Sedimentation, Erosion, or Contamination Affecting Special Status Plants or Wetlands	HS-1c, Erosion Control Procedures
BB-2: Construction Effects on Rare or Special Status Plants	BB-2a, Rare Plant Avoidance
BB-3: Temporary Loss of Vegetation During Construction	BB-3a, Tree Avoidance and Replacement
BB-4: Permanent Vegetation Loss from Aboveground Facilities	None
BB-5: Temporary Impacts From Construction in Wetlands	BB-5a, Wetland Avoidance and Restoration BB-5b, Trench Backfill and Topographic Restoration BB-5c, Riparian Avoidance and Restoration
BB-6: Weed Invasion Affects Special Status Plants or Wetlands	BB-6a, Weed Management
BW-1: Wildlife Habitat Removal	BW-1a, Pre-Construction Surveys BW-1b, Establish Buffer Zones BW-1c, Conduct Worker Training BW-1d, Confine Activity to Identified ROW BW-1e, Minimize Disturbance at Water Crossings
BW-2: Direct Wildlife Mortality During Construction	BW-2a, Reduce Direct Mortality to Wildlife BW-2b, Employ Approved Biological Monitors
BW-3: Habitat Removal or Disturbance of Special Status Wildlife	BW-3a, Protect Special Status Wildlife BW-3b, Protect Special Status Bird Species BW-3c, Protect Raptor Nests BW-3d, Consultation to Minimize Impacts
BW-4: Wildlife Disturbance from Increased Human Presence	BW-1a, BW-1d, BW-c, BW-1e BW-3a to BW-3c
BM-1: Construction Degrades Habitat for Marine and Aquatic Resources	HS-1a, HS-1b, HS-1d, Reduction of Sedimentation HS-1c, Erosion Control Procedures HS-3a, Contingency Plan for Unanticipated Release of Drilling Fluids
Pipeline Accident Impacts: Proposed Project & Existing Pipeline ROW	
B-1: Pipeline Accident Affecting Biological Resources	B-1a, Pipeline Spill Mitigation for Biological Resources
B-2: Accident Response Effects on Biological Resources	Mitigation Measure for construction impacts (above) B-1a, Pipeline Spill Mitigation for Biological Resources
Pipeline Maintenance and Repair Impacts: Proposed Project & Existing Pipeline ROW	
B-3: Pipeline Maintenance and Repair Could Affect Sensitive Species and Habitats	B-3a: Pipeline Operations and Maintenance
Proposed Project Impacts at Cordelia	
B-4: Construction and Potential Accidents in Cordelia Marsh	B-4a: Cordelia Mitigation Segment
Existing Pipeline ROW Alternative	
B-5: Construction and Operation in Suisun Marsh	B-5a: Mitigation Segment EP-1
BB-7: Construction in Native Grassland Causes Vegetation Removal	BB-7a: Native Grassland Avoidance and Restoration

Impact Discussion

Construction impacts to individuals or known habitats of rare, threatened, or endangered plant species would be considered a significant impact. Habitat degradation within wetlands adjacent to the construction areas and indirect impacts to special status wetland plant species, such as Mason's lilaeopsis, Suisun marsh aster, Contra Costa goldfields, and hogwallow starfish, could occur where construction and related activities (from HDD work areas and pipeline trenching, etc.) may impinge upon habitat due to erosion/sedimentation of clean and/or contaminated soils exposed during trenching (for instance, within the Rhodia Plant area), or release of hazardous substances (i.e., diesel fuel). This impact would be considered potentially significant (Class II).

Mitigation Measures for Impact BB-1: Construction Causing Sedimentation, Erosion, or Contamination Affecting Special Status Plant Species or Wetlands

Compliance with NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan and Mitigation Measure HS-1c, described in Section D.8, requiring use of Best Management Practices for erosion/sedimentation and management of hazardous substances, would reduce this impact to less than significant levels.

Residual Impact. Implementation of the measures defined in the Hydrology and Water Quality Section (Section D.8) would ensure that this impact on special status plants or wetlands remained less than significant.

Impact BB-2: Construction Effects on Rare or Special Status Plants

Construction could result in the loss of individuals or known habitats of sensitive plant species, or the loss of special status plant species or associated habitats. (Potentially Significant, Class II).

Impact Discussion

Botanical surveys of the project area conducted by URS were not appropriately timed with the blooming period of one special status plant species, fragrant fritillary, which has the potential to occur along the project area. Although the cited blooming period for these species is February through April, the optimum bloom period is in mid-March. However, the earliest botanical survey conducted by URS was in early April, which was probably not early enough to determine the presence or absence of these species within the project area. Construction and related activities causing direct impact to these species or its habitat and would be considered potentially significant (Class II). Implementation of Mitigation Measure BB-2a (Rare Plant Avoidance), requiring appropriately timed pre-construction survey to map and flag locations supporting these species (if located) for avoidance during construction, would reduce this impact to less than significant levels. The loss of individuals or known habitats of rare, threatened, or endangered plant species would be considered a significant impact. Such impacts are possible where construction and related activities would remove or impact the buffer zone for species, such as Suisun marsh aster and hogwallow starfish. Construction activities resulting in the removal of a special status plant species would be considered potentially significant (Class II).

Botanical surveys conducted by URS included the on-site work areas, which would be within the 100-foot project area, but did not include off-site staging areas. SFPP, however, has indicated that all off-site work areas would be located entirely within paved or gravel areas or on active non-vegetated agricultural lands, both of which do not contain suitable habitat for special status plant species. Two locations along the project ROW, however, could not be accessed (i.e., an area east of Vanden Road between MP 30.7 – 33.2 and a location north of Hay Rd. between MP 37.2 – 41.9) The habitats that occur in these areas were delineated by using aerial photography and direct observation from adjacent areas, but

were not thoroughly surveyed. Construction and related activities causing a direct impact to special status plant species or their habitat that potentially occur in these un-surveyed areas would be considered potentially significant (Class II).

Mitigation Measure for Impact BB-2: Construction Effects on Rare or Special Status Plants

BB-2a Rare Plant Avoidance. SFPP shall avoid impacts to special status plant species by:

- Conducting pre-construction surveys for special status plant species within un-surveyed locations of the proposed ROW (between MP 30.7 – 33.2 and 37.2 – 37.9) and for certain plant species that were not surveyed during the appropriate flowering period.
- Flagging, mapping, and fencing to protect any special status plant species within the 200-foot-wide Study Area during construction.
- Limiting all proposed roadway construction to the existing roadway surface(s) where adjacent special status plant species occur, i.e., adjacent Contra Costa goldfield populations at access road near Ornbaum Kennels (MP 19.7 – 19.8), Cordelia Road (MP 22.9 – 23.2), Walters Road (MP 28.1 – 28.7), Peabody Road (MP 29.8 – 23.2), and Carquinez goldenbush occurrences along Hay Road (MP 38.9).
- A worker training program with regard to special status species (see BW-1c).
- Supervision and verification of the implementation of these measures by an agency-approved Environmental Monitor (see BW-2b).

Prior to construction, the location of special status plant species will be determined through appropriately-timed surveys according to California Native Plant Society (CNPS) protocol; this shall apply only to (1) areas not surveyed during previous surveys that support potential habitat for any rare plant species, and (2) the rare *Fritillaria* species for the identified project segments with potential habitat (i.e., serpentine or clay soils) for which appropriately-timed surveys were not conducted during previous survey efforts along the pipeline right-of-way (ROW). Determination of potential habitat for rare species, and surveys conducted for presence of rare plant species will be performed by a qualified botanist. These surveys will be appropriately timed to cover the blooming periods of the special status plant species with the potential to occur in the area.

Any rare plant species within the Study Area (including the 100-foot-wide ROW, 50-foot-wide buffer zone on each side of the ROW, work areas, staging areas, and/or launcher/receiver stations) will be flagged, accurately mapped on construction plans, and fenced to protect the area occupied by the species during construction. Installation of construction fencing shall be supervised by an Environmental Monitor (a qualified biologist approved by the CSLC, USFWS, and CDFG), and appropriate buffer distances from the rare plant population shall be determined on-site by the Monitor. The Monitor shall have the authority to require installation of silt fencing in highly sensitive areas or under certain conditions where potential erosion may impact a special status plant species or its habitat.

Compliance with these measures prior to and during construction will be supervised and verified by the Environmental Monitor.

Residual Impact. With the implementation of Mitigation Measure BB-2a (Rare Plant Avoidance), impacts would be reduced to less than significant.

Impact BB-3: Direct, Temporary Impact to Vegetation Due to Removal

Upland vegetation removal during construction activities could result in temporary loss of vegetation, adversely impacting upland vegetation. (Potentially Significant, Class II or Less Than Significant, Class III)

Impact Discussion

Impacts to upland vegetation types such as oak woodland, annual grassland, cultivated fields, and ruderal areas would occur due to vegetation removal within the 100-foot-wide project ROW during grading, trenching, pit excavation (associated with the three bore stream crossings), and staging resulting in a temporary loss of vegetation. This temporary impact to annual grasslands, and cultivated field ruderal area would be considered adverse, but not significant (Class III), but impacts to riparian forest and oak woodland (including individual oak trees) are potentially significant (Class II).

A summary of the riparian and oak tree species that occur within the ROW and may be affected by the Proposed Project are presented in Table D.4-9. These tables include only trees that, if impacted, would require compensation mitigation [i.e., riparian and oaks having trunks that are equal to or exceed four inches in diameter at breast height (DBH)].

Table D.4-9. Oak and Riparian Tree Species Potentially Impacted by the Proposed Project

Common Name	Scientific Name	DBH		
		4-12"	12-24"	>24"
Oak Tree Species				
Buckeye	<i>Aesculus californica</i>	41	5	—
Coastal Live Oak	<i>Quercus agrifolia</i>	56	55	2
Blue Oak	<i>Quercus douglasii</i>	2	—	1
Valley Oak	<i>Quercus lobatat</i>	37	15	5
Total Oak Trees Affected		136	75	8
Riparian Tree Species				
Box Elder	<i>Acer negundo</i>	54	1	—
Oregon Ash	<i>Fraxinus latifolia</i>	48	4	—
Sycamore	<i>Platanus racemosa</i>	—	1	—
Fremont Cottonwood	<i>Populus fremontii</i>	3	10	3
Goodding Willow	<i>Salix gooddingii</i>	244	62	5
Sandbar Willow	<i>Salix exigua</i>	8	—	—
Total Riparian Trees Affected		357	78	8

Source: Survey by URS

Mitigation Measures for Impact BB-3: Direct, Temporary Impact to Vegetation Due to Removal

BB-3a Tree Avoidance and Replacement. SFPP shall avoid, minimize, and compensate for impacts to trees as identified in Table D.4-9, including those protected by local ordinances, by:

- Pre-construction identification, fencing and avoidance of trees to the maximum extent during construction.
- Consultation with local jurisdiction if unavoidable impacts to locally protected trees ("Protected Trees") are likely to occur.
- Development and implementation of a Tree Replacement Plan for loss and/or significant damage to trees.
- Supervision and verification of the implementation of these measures by the Environmental Monitor.

The initial step for this measure shall be to determine the size and location of all trees located within and adjacent to the project right-of-way, work areas, staging areas, and launcher/receiver stations. These trees will be then assessed by a qualified biologist or

arborist to identify and map Protected Trees.¹ If it is determined that the project will trim, remove, or damage the roots of Protected Trees, avoidance measures shall be taken. Avoidance will consist of installing protective fencing around the dripline of any Protected Tree. All construction activities, including excavation, grading, leveling, and disposal or deposition of harmful materials will be prohibited inside the dripline fence. Attachment of wires, ropes, or signs to Protected Trees shall also be prohibited. The approved Environmental Monitor (see BW-2b) shall supervise compliance with these protective measures prior to and during construction activities.

If trimming, removal or root damage to a Protected Tree is unavoidable, the appropriate jurisdiction will be consulted. Further actions may require a permit that will include fees and/or replacement for affected trees. Contra Costa County and the City of West Sacramento require permits and associated variable fees to damage or remove certain Protected Trees.

Proposed trimming or other damage to Protected Trees along the proposed route shall be evaluated by a qualified arborist, who shall identify appropriate measures to minimize tree loss and shall supervise all associated activities in accordance with permit conditions issued by the responsible jurisdiction.

If the Proposed Project requires removal of trees (Protected Trees or others), a qualified forester, arborist, or restoration ecologist shall evaluate the tree replacement procedures to ensure that the replacement will be consistent with applicable local jurisdiction requirements, such as County Tree Ordinances, and with additional permit conditions imposed by the local agency (e.g., local oak tree protection requirements). Additional mitigation may be required by CDFG for impacts to riparian trees (refer to Mitigation Measure BB-5c). Tree removal shall not be permitted until a qualified forester, arborist, or restoration ecologist has reviewed the following procedures:

- Identification of proposed tree removal locations.
- A discussion demonstrating how maximum avoidance has been accomplished and why the trees proposed for removal cannot be avoided.
- Discussion of appropriate tree replacement ratios, as defined by the local jurisdiction, or, at a minimum, a 3:1 replacement to removed/impacted ratio for non-protected trees.
- Identification of suitable tree replacement locations within or immediately adjacent to the original tree impact area.
- Tree species and size specifications.
- Proposed understory native seed mix composition and application methods.
- Planting methodology, including spacing and proper timing of plant installation.
- Description of protective staking and caging measures.
- Description of irrigation and plant maintenance regime.
- Description of five-year monitoring effort to measure replacement success.

¹ Protected Trees are those protected under local ordinances and include the following: (1) Contra Costa County requires a permit and conditional mitigation for impacts to or removal of “Heritage Trees” and “Protected Trees”, (2) Yolo County identifies a provision prohibiting the import or export of Elm trees, (3) the City of Fairfield requires submission of a written request to remove any tree on private or public land, (4) the City of West Sacramento requires a permit and permittee-proposed mitigation measures for impacts to or removal of “Heritage Trees”, “Landmark Trees”, and “Significant Trees.”

- **Success criteria (including survival rates) and contingency measures in case of mitigation failure.**
- **Submission of an annual monitoring report to responsible agencies evaluating mitigation success.**
- **Successful implementation of tree replacement shall be evaluated five years after all human support (e.g., replanting, fertilization, irrigation) has ceased. At that time, a report shall be submitted to the local jurisdiction, and CDFG, if requested, summarizing the results. A determination will be made by these agencies as to whether continued monitoring is required and/or whether implementation of contingency measures is required.**

Residual Impact. Implementation of Mitigation Measure BB-3a, requiring identification, flagging and avoidance of Protected Trees (certain species, groves and/or large-sized trees as defined by the local jurisdiction) and other trees and, if necessary, mitigation by planting replacement trees, would reduce the impact to trees to less than significant levels.

Impact BB-4: Permanent Vegetation Loss from Installation of Aboveground Facilities

There would be direct permanent loss of vegetation due to valve construction. (Less than Significant, Class III)

Impact Discussion

Construction and placement of the project's valves would result in permanent losses of vegetation associated with developed areas (see Table B-4 and Figure B-2 for the locations of proposed valves). Because the area permanently impacted at the proposed valve locations is small and occurs in developed areas, this impact is also considered adverse, but less than significant (Class III).

Mitigation Measure. None required.

Residual Impact. The potential impact from permanent vegetation removal would be less than significant and no mitigation is required.

Impact BB-5: Temporary Impacts from Construction in Wetlands

Construction in wetlands (freshwater seep, brackish marsh, freshwater marsh, seasonal alkali marsh, salt marsh, riparian scrub, riparian forest, and vernal pool) would result in vegetation removal within the project ROW, also including a maximum 100-foot construction ROW, laydown areas, HDD setup areas, pipe-stringing areas, and staging areas. Construction could also disrupt the hydrology of the wetlands within and adjacent to the construction area, affecting wetlands that are habitat for special status plant species. (Potentially Significant, Class II)

Impact Discussion

A Wetlands Jurisdictional Delineation was performed by URS Corporation (2003) along the proposed route in order to locate, delineate, and map portions of the route that qualify as wetlands and other waters of the U.S. under federal jurisdiction pursuant to Section 404 of the Clean Water Act. The project area was defined as the area that may be disturbed during construction, including a maximum 100-foot construction ROW, laydown areas, HDD setup areas, pipe-stringing areas, and staging areas. The project study area also included the project area plus a 50-foot buffer zone on each side of the construction ROW.

The distribution of wetland types corresponds to subtle differences in topography, soils, and land use along the route. The largest concentrations of wetlands in the study area were found to be located near Pacheco Slough, Peyton Slough, Cordelia Slough, a tributary to Peytonia Slough (MP 23.8), and at the Yolo Bypass. Table D.4-10 below gives a summary of the wetland areas by type impacted by the Proposed Project. Appendices 1C through 1E list the Waters of the U.S. in the project study area and affected acreages. Appendix 1E is a set of aerial strip maps illustrating the jurisdictional delineation or wetlands along the project ROW.

Table D.4-10. Wetland Impact Summary Table

Jurisdictional Type	Affected Area (acres)	% Total Affected Area ¹	% of Study Area Total ²	Number of Features in the Study Area ³
Freshwater Marsh	2.18	3%	28%	12
Seasonal Marsh	44.20	65%	26%	101
Seasonal Alkali Marsh	14.99	22%	40%	30
Brackish Marsh	1.39	2%	13%	11
Seasonal Seep	0.15	0%	57%	3
Riparian Forest	0.89	1%	13%	9
Riparian Scrub	0.28	0%	17%	2
Vernal Pool	0.77	1%	28%	23
Total Wetlands	64.85	95%	27%	191
Non-Wetland Waters of the U.S.	3.16	5%	6%	79
Total Jurisdictional Waters	68.01	100%	23%	270
Non-Jurisdictional Waters	1.68		31%	30

Notes:

¹ Percentage calculated by dividing the total affected area for each type by the total area of affected jurisdictional waters (68.01 acres).

² Percentage calculated by dividing the total affected area for each type by the total area of that type in the study area (100 feet each side of centerline). Percentages indicate impact reductions based on proposed avoidance and minimization measures.

³ Number of jurisdictional features of each type delineated in the study area.

Temporary impacts could be caused by interception and detention of groundwater or surface water within the excavated trench, thus reducing the hydrologic input to the adjacent wetland. Long-term hydrologic change to wetlands could result from trench backfill and topographic restoration activities. Backfill material and methods would affect wetland hydrology by altering surface and subsurface flow. For example, the pipeline backfill materials (such as gravel or coarse-textured non-native fill) could be more or less permeable than native materials. Surface alteration would impede or accelerate drainage. Compaction and settlement of backfill would create ditches along the pipeline. Excess backfill may restrict surface or groundwater connections to wetlands. Impacts to the hydrologic function of wetlands would be considered potentially significant (Class II). Impacts to wetlands that are habitat for special status plant species would cause an impact to the species occupying those habitats. Such impacts may occur to species, such as Suisun marsh aster, Contra Costa goldfields, and hogwallow starfish. Impacts to these special status plant species and wetlands/riparian forests would be considered potentially significant (Class II). Implementation of Mitigation Measures BB-5a, BB-5b, and BB-5c (below) would reduce this impact to less than significant levels.

Mitigation Measure for Impact BB-5: Construction in Wetlands Causes Vegetation Removal

BB-5a Wetland Avoidance and Restoration. SFPP shall avoid, minimize, and/or compensate for damage and/or loss of wetland vegetation types due to pipeline construction activities by completing the following:

- **Maximum avoidance of jurisdictional wetlands by fencing wetlands and appropriate buffer zones.**
- **Restricted vegetation removal and topsoil storage and replacement.**
- **Consultation with the USACE and RWQCB for any unavoidable wetland impacts.**
- **Preparation and implementation of wetlands restoration for any unavoidable impacts to wetlands.**
- **Supervision and verification of the implementation of these measures by the Environmental Monitor.**

Avoidance will consist of fencing the wetlands within the ROW, including appropriate buffer zones, to minimize impacts to wetland vegetation types. If construction work areas and/or associated overland travel in wetlands is unavoidable, all equipment, vehicles and associated construction materials shall be placed on protective mats to avoid soil compaction, such that they do not make direct contact with the wetland. Vegetation clearing and/or installation of mats shall be conducted only from areas scheduled for immediate construction work (within 10 days) and only for the width needed for active construction activities. Mats shall be removed immediately following completion of activities within each active construction area. During pipeline construction, the 12 inches of topsoil shall be salvaged, stored in an upland location, and replaced wherever the pipeline is trenched in wetlands. Prior to permit issuance and final design, project construction plans shall depict appropriate measures for topsoil protection and storage that will allow survival of native seed within the topsoil. Topsoil shall be placed at the surface on top of fill material and not be used to backfill the trench, and excavated trench spoils or excess fill shall be placed on top of the pipeline under topsoil and not dispersed onto the surface of the ROW. Implementation of these measures prior to and during construction will be supervised and verified by the Environmental Monitor (see Mitigation Measure BW-2b).

Unavoidable direct impacts to wetland vegetation types during construction and/or associated overland travel will require consultation with the appropriate jurisdiction (USACE and RWQCB) and will likely require a permit (impacts to riparian scrub would likely need to be addressed in consultation with CDFG; see Mitigation Measure BB-5c). These impacts shall be mitigated by restoration of the affected area to pre-construction conditions in accordance with permits issued by the USACE and RWQCB. Consistent with requirements set forth in permits issued by the USACE and RWQCB for work in wetlands, and with other plans developed for the pipeline construction project, the following procedures shall be implemented:

- **A delineation of potentially affected wetlands for any areas not included in the jurisdictional delineation performed by URS (2003).**
- **A discussion demonstrating how maximum avoidance has been accomplished and why the wetlands proposed to be impacted cannot be avoided.**
- **Methods proposed for restoring the affected wetlands, including topsoil preservation and backfilling (see Mitigation Measure BB-5b), soil and grade preparation such that there is no change in pre-construction contours, regionally native seed and/or plant materials to be used and installation methods, and maintenance measures, including weed control.**
- **Minimum 1:1 replacement ratio for area and function of temporarily damaged wetland areas.**

- A minimum five-year monitoring program with detailed success criteria regarding species cover, species composition, species diversity, wetland area and depth as compared with pre-construction conditions documented prior to construction by a qualified biologist such that the function of the affected wetland and hydrology is restored, the methods and results of which shall be described in the Plan.
- Annual monitoring over a minimum five-year period to evaluate whether the pipeline installation is substantially altering surface or subsurface flow of water as determined through (1) topographic assessments of the pipeline sites and (2) assessments of vegetation and hydrology conditions within adjacent wetlands (as compared to pre-construction conditions).
- Methods for correcting observed alterations to surface or subsurface flows.
- Annual reporting requirements to responsible agencies.
- Detailed contingency measures in case of restoration failure, as determined by the responsible agencies following the five-year monitoring period, requiring additional off-site wetland creation at a minimum ratio of 1:1 for created wetland acreage.

BB-5b Trench Backfill and Topographic Restoration. The purpose of this measure is to prevent temporary and permanent hydrologic alteration to wetlands and associated sensitive vegetation from backfill activities associated with pipeline installation by requiring:

- Appropriately-timed work so that trenches are not excavated or backfilled during the wet season.
- Preparation and implementation of soil and grade restoration measures including backfill and compaction methods and an annual monitoring program.
- Supervision and verification of the implementation of these measures by the Environmental Monitor.

Prior to construction, responsible agencies (including the RWQCB, CDFG, USACE, and County agencies) shall evaluate soil and grade restoration measures to be implemented along the ROW. Restoration of wetlands directly impacted by pipeline construction is addressed in Mitigation Measure BB-5a. To prevent hydrologic impacts to wetlands and associated vegetation resulting from pipeline backfill activities the following procedures shall, at a minimum, be addressed, in accordance with any permit conditions issued by responsible agencies:

- Excavation, soil storage and backfill methods to ensure that topsoil returned to the surface and is not be used to backfill the trench, and subsoil is not be dispersed onto the surface.
- Requirements for the separation of topsoil and subsoil in upland storage locations.
- Methods to ensure native seed survival within stored topsoil.
- Circumstances requiring use of imported soils, proposed source of soil.
- Backfill compaction specifications to ensure that changes in infiltration and lateral flow do not substantially alter subsurface hydrology.
- Specifications for the restoration of pre-construction surface topography to ensure that mounds or berms, due to overfill, or trenches, due to soil settling, are not created that will substantially alter surface hydrology.

Implementation of these measures during and after construction shall be supervised by the Environmental Monitor.

BB-5c Riparian Avoidance and Restoration. SFPP shall avoid, minimize, and compensate for impacts to riparian forest during construction due to trenching, open cut crossings of streams, and pit excavation for bore crossings of streams by:

- Identification and avoidance of riparian forest by boring under streams where feasible.
- Consultation with CDFG for any unavoidable impacts to riparian vegetation.
- Fencing riparian vegetation adjacent to work areas to prevent impacts.
- Preparation and implementation of riparian restoration, including replanting and monitoring elements.
- Supervision and verification of implementation of these measures by the Environmental Monitor.

Riparian forest within the ROW shall be identified by a qualified ecologist, mapped on construction plans and fenced prior to construction. These areas should be avoided to the maximum extent feasible. If riparian forest cannot be avoided by boring under the stream, the following impact minimization measures, at a minimum, shall be implemented during construction in accordance with any permit conditions imposed by responsible agencies:

- The work area shall be limited to the minimum necessary and shall be fenced prior to construction.
- Vegetation within the work area shall be cleared in a manner that does not damage the root system of adjacent remaining vegetation.
- The upper 12 inches of topsoil shall be salvaged, stored at an upland location, and returned to the surface after trench backfilling is complete.
- Existing vegetation shall be cleared only from areas scheduled for immediate construction work (within 10 days).

The approved Environmental Monitor shall supervise compliance with these protective measures prior to and during construction activities.

Unavoidable direct impacts to riparian forest vegetation during construction will require consultation with the appropriate jurisdiction (CDFG) and will likely require a permit (portions of riparian forest may be considered jurisdictional wetlands and impacts to these areas would need to be addressed in consultation with USACE — see Mitigation Measure BB-5a). These impacts shall be mitigated by restoration of the affected area to pre-construction conditions in accordance with permits issued by CDFG. A qualified ecologist shall dictate the following procedures to ensure that they will be consistent with applicable local jurisdiction requirements, such as County Tree Ordinances, and with any additional permit conditions imposed by the local agency as well as CDFG and other agencies. If a tree within the riparian forest to be removed qualifies as a Protected Tree under the local jurisdiction, Mitigation Measure BB-3a shall be applied and any mitigation standards shall default to the one requiring the higher standard. Riparian forest removal shall not be permitted until the following procedures are documented:

- Identification of proposed riparian forest removal (and subsequent restoration) locations from URS's Jurisdictional Delineation Report.
- A discussion demonstrating how maximum avoidance has been accomplished and why the riparian forest proposed for removal cannot be avoided.
- Methods to restore streambanks to pre-construction conditions.

- Discussion of appropriate replacement ratios (in accordance with issued permit conditions, or, at a minimum, a 1:1 replacement ratio of habitat acreage and at least 3:1 replacement ratio of the number of trees and shrubs present prior to construction).
- Proposed native tree and shrub species matching pre-construction conditions.
- Proposed understory native seed mix composition and application methods.
- Planting methodology, including spacing and proper timing of plant installation.
- Description of protective staking and caging measures for installed plants.
- Description of irrigation and plant maintenance regime.
- Description of five-year monitoring effort to measure replacement success.
- Success criteria (including survival rates and habitat function as compared to pre-construction conditions) and contingency measures for off-site habitat creation in case of mitigation failure.
- Submission of an annual monitoring report to responsible agencies evaluating mitigation success.

Successful implementation of the riparian restoration procedures shall be evaluated five years after all human support (e.g., replanting, fertilization, irrigation) has ceased. At that time, a report shall be submitted to the responsible agencies summarizing the results and a determination will be made by these agencies as to whether continued monitoring is required and/or whether implementation of contingency measures is required.

Residual Impact. Implementation of Mitigation Measure BB-5a, requiring avoidance and, if necessary, restoration/creation, would reduce the impact to wetlands to less than significant levels. Implementation of Mitigation Measure BB-5b, requiring stockpiling of and backfilling with native soil (or comparable type, if contaminated), proper compaction and contour grading, would reduce this impact to less than significant levels. Implementation of Mitigation Measure BB-5c, requiring identification and avoidance of riparian vegetation and, if necessary, mitigation by planting replacement riparian habitat, would reduce riparian impacts to less than significant levels.

Impact BB-6: Weed Invasion Affecting Special Status Plant Species, Upland Vegetation, and/or Wetlands

Construction-related disturbance could provide an opportunity and seedbed for the invasion of weeds, which could adversely affect special status plant species, upland vegetation, and/or wetlands. (Potentially Significant, Class II)

Impact Discussion

Construction-related disturbance of habitats could allow invasion of weeds. Weeds are non-native opportunists that have developed reproductive features that give them a competitive advantage over many native plants. The introduction or expansion of exotic species is deleterious to native vegetation types. The introduction or expansion of exotic species may cause an impact to Suisun marsh aster, Contra Costa goldfields, and hogwallow starfish. Impacts to special status plants, upland vegetation, and/or wetlands from weed invasion would be considered potentially significant (Class II). Implementation of Mitigation Measure BB-6a (Weed Management) would reduce this impact to less than significant levels.

Mitigation Measure for Impact BB-6: Weed Invasion Affecting Special Status Plant Species, Upland Vegetation, and/or Wetlands

BB-6a Weed Management. SFPP shall prevent invasion of invasive, non-native plant species into sensitive plant species habitats and vegetation types by conducting:

- Implementation of measures during construction, such as cleaning vehicles prior to off-road use, using weed-free imported soil, restricted vegetation removal and requiring topsoil storage.
- Development and implementation of weed management procedures to monitor and control the spread of weed populations along the pipeline.

The following measures shall be implemented to control the introduction of weed² species within areas disturbed during pipeline construction; implementation of these measures during construction will be verified by the Environmental Monitor:

- Vehicles used in pipeline construction will be cleaned prior to operation off of maintained roads.
- Fill material, soil amendments, gravel etc. required for construction/restoration activities shall be obtained from a source that can certify the soil as being “weed free.”
- Existing vegetation shall be cleared only from areas scheduled for immediate construction work (within 10 days) and only for the width needed for active construction activities.
- During pipeline construction, the upper 12 inches of topsoil (or less depending on existing depth of topsoil) shall be salvaged and replaced wherever the pipeline is trenched through open land (not including graded roads and road shoulders).
- Disturbed soils shall be revegetated with an appropriate seed mix that does not contain weeds (as defined below); revegetation in sensitive vegetation types shall adhere to the relevant mitigation measures: BB-3a, BB-5a, and/or BB-5c.

Residual Impact. Implementation of Mitigation Measure BB-6a, would reduce any residual impact to less than significant levels.

Wildlife and Aquatic Species

Clearing, grading, and trenching would generate the greatest construction impacts on wildlife. Removal of vegetation during the construction phase of this project will temporarily diminish the amount of habitat available for wildlife using the area. Individuals displaced from areas cleared of vegetation could be lost if adjacent habitats are at carrying capacity or if wildlife occupying them are exposed to an increased risk of predation. Direct wildlife mortality may occur during habitat clearing, earth removal, grading, trenching and equipment movement or staging. Burrow-dwelling animals; eggs and nestlings of bird species with small, well-hidden nests (avoidance subject to the Migratory Bird Treaty Act); and species with limited mobility (e.g., salamanders, frogs and toads, lizards, snakes, ground squirrels, and gophers) are susceptible to death or injury as a result of construction-related activities. More mobile species like birds and larger mammals are expected to disperse into adjacent habitat areas during the land clearing, grading, and trenching phases of this project. Local wildlife populations along the ROW are expected to decline during the construction phase of the project, but are expected to return to their pre-construction levels following

² A “weed” is defined here as any plant species (1) included on the California Exotic Pest Plant Council List A or the Red Alert list of species which are serious problems in wildlands (CalEPPC, 1999), or (2) identified as a noxious weed with potential to damage agriculture by the California Department of Agriculture.

successful reclamation and revegetation of the pipeline corridor. Construction across linear habitats such as streams could interfere with movement patterns for wildlife that use stream-side riparian and wetland corridors for dispersal (e.g., black-tailed deer, raccoon, muskrat, bobcat, coyote, and skunks). Construction could also result in an increase in accidental vehicle-related mortalities of wildlife due to increased traffic along the construction corridor. Daytime-active reptiles and mammals are the most at risk from construction vehicles.

Noise, dust, visual disturbance from increased human activity, and exhaust emissions from construction equipment could result in native habitats adjacent to the construction zone being temporarily unattractive to wildlife. Construction could also impact wildlife in adjacent habitats by interfering with breeding or foraging activities, altering movement patterns, or causing animals to temporarily avoid areas adjacent to the construction zone. Nocturnally-active wildlife (e.g., coyotes, foxes, skunks, bats, nighthawks, poorwills, and owls) could be less affected by construction than diurnally active species (e.g., hawks, snakes, lizards, and ground squirrels). Large and medium-sized animals like coyotes, foxes, bobcats, rabbits, and hawks are expected to temporarily avoid areas immediately adjacent to construction zones. Wildlife are most vulnerable to construction-related disturbances during their breeding seasons. Disturbances from construction could result in nest, roost, or territory abandonment and subsequent reproductive failure if these disturbances were to occur during an affected species breeding season.

The majority of proposed pipeline route would be constructed along a variety of already disturbed habitats. Most of the wildlife impacted by construction in such areas are common, wide-ranging species. Due to the narrow area and short duration of disturbance along this linear project, most of the more common wildlife species found along the pipeline route are expected to quickly recolonize the corridor after construction and subsequent revegetation work is completed.

Four general impact categories are described below. Project-related disturbance in each category includes all activities that might occur during the life of the project, including construction, operation, scheduled maintenance activities, and accidental release. Segment-specific potential wildlife impacts related to project construction, and project-wide impacts related to operation, ongoing maintenance, and possible pipeline accidents are discussed following the general impact categories.

Impact BW-1: Wildlife Habitat Removal

Wildlife habitat removal from construction could effectively remove existing habitat, thereby reducing its availability to local wildlife populations. (Potentially Significant, Class II)

Impact Discussion

Wildlife habitat removal can result from construction and ongoing operation and maintenance activities, including: (1) ground surface blading, grading, and subsurface trenching, (2) tree or shrub removal and tree trimming/crushing, (3) storage of trench spoils, or (4) pipeline stringing and installation. Each of these activities could effectively remove existing habitat, thereby reducing its availability to local wildlife populations. In some areas, construction access would require construction of new roads or upgrading of existing roads. Grading previously undisturbed surfaces to access the ROW could remove rocks, shrubs and other objects from the soil surface, leaving a relatively clear pathway for construction vehicles.

Temporary loss of habitat within the ROW could affect some small mammal, reptile and/or amphibian species with very limited home ranges and mobility. For these species, the clearing for the pipeline ROW and access roads could represent a slight reduction in the carrying capacity of a portion of their home range until a productive vegetation cover is re-established. However, most of these species are common and widely distributed throughout the area and the loss of a few individuals as a result of habitat removal would have a negligible impact on overall populations of the species, either locally or throughout the

region. Temporary removal of wildlife habitat along the length of the pipeline ROW would result in loss of wildlife habitat, and is therefore considered a potentially significant impact. This temporarily affected habitat, however, will be restored to pre-existing conditions (pre-existing topography and vegetation community) immediately following construction (Mitigation Measure BB-5b). Therefore, temporary clearing along the proposed alignment is considered a Class II impact; potentially significant, but mitigable to less than significant levels. Potential impacts to special status wildlife species are discussed below under Impact BW-4.

Mitigation Measures for Impact BW-1: Wildlife Habitat Removal

BW-1a Pre-Construction Surveys. The Applicant shall carry out pre-construction biological resource surveys to identify the location of sensitive biological resources. Pre-construction surveys will be consistent with all survey protocols and requirements stipulated by resource agencies as a condition of project approval, including those species addressed under a USFWS Biological Opinion. Sensitive resources shall be clearly mapped and marked on construction drawings or project maps before construction in these areas. If sensitive resources cannot be avoided, no work shall be authorized until the appropriate resource agencies (CDFG, USFWS, NOAA Fisheries) determine that the action will not result in significant biological impacts (see Mitigation Measure BW-3d).

BW-1b Establish Buffer Zones. Biological monitors employed by SFPP and approved in advance by the CSLC shall locate and stake identified sensitive resources before construction activities begin in specified segments. Monitors shall also inspect all areas with sensitive resources prior to construction to ensure that barrier fencing, stakes, and required setback buffers are maintained. Avoidance measures and buffer distances vary for each species and are specified for some species in Mitigation Measures BW-3a, BW-3b, and BW-3c. The specific buffer zone distance will be determined by the appropriate resource agencies (CDFG and USFWS).

BW-1c Conduct Worker Training. The Applicant shall conduct *Worker Environmental Awareness Program* (WEAP) training for construction crews. All SFPP construction crews and contractors shall participate in WEAP training prior to starting work on the project and within two days of any new worker arrival. The program will consist of a briefing on environmental issues relative to the Proposed Project. Training will be conducted by the Environmental Monitor. A video presentation of this training may be used for some training sessions. The training program will include an overview of the legal status, biology, distribution, habitat needs, and compliance requirements for each special status species that may occur in the project area. The presentation will also include a discussion of the legal protection for endangered species under the FESA and CESA. A fact sheet conveying this information will be distributed to all personnel who enter the project site. Upon completion of the orientation, employees will sign a form stating that they attended the program and understand all mitigation measures. These forms will be filed at the SFPP's offices and will be accessible to the appropriate agencies. The WEAP training shall include a brief review of the special-status species and other sensitive resources that could exist in the project area (including their life history and habitat requirements), the locations of sensitive biological resources, and their legal status and protection under the U.S. and State Endangered Species Acts. The education program shall include materials describing sensitive resources, resource avoidance, permit conditions, and possible fines for violations of State or federal environmental laws. The program shall cover the mitigation measures, environmental permits, and Proposed Project plans, reclamation plans, and any other required plans.

The Applicant shall be responsible for ensuring that all project personnel and subcontractors adhere to the guidelines and restrictions. Additional training shall be conducted as needed — including morning “tailgate” sessions — to update crews as they advance into sensitive areas, and to educate new personnel brought on the job during the construction period. Project personnel will receive a hardhat sticker or be issued a card verifying compliance with the above mitigation measure. In addition, a record of all personnel trained during the project will be maintained and made available for compliance verification.

BW-1d Confine Activity to Identified ROW. The Applicant shall confine construction equipment and associated activities to the approved 100-foot ROW in all areas that support sensitive resources (e.g., near areas that support riparian and wetland communities and special-status species adjacent to the work area), as defined on project maps (and as summarized in Mitigation Measure BW-1a).

In sensitive areas that will be avoided by directional drilling and boring, drill rigs and equipment staging shall remain outside of sensitive habitats, with an adequate buffer, consistent with established resource agency guidelines to avoid potential adverse effects to the resource. Work area boundaries shall be delineated with flagging or other marking to minimize surface disturbance associated with vehicle straying and minimize the potential for inadvertent worker intrusion into sensitive areas. Special habitat features identified by the resource monitor shall be avoided and previously disturbed areas within the project ROW shall be utilized for stockpiling excavated materials, equipment storage, and vehicle parking.

During WEAP training (required in Mitigation Measure BW-1c), construction personnel shall be informed of the importance of remaining within the designated ROW. The resource coordinator, with support from resource monitors, as necessary, will ensure that construction equipment and associated activities avoid any disturbance of sensitive resources outside the ROW.

BW-1e Minimize Disturbance at Water Crossings. The pipeline shall be directionally drilled or bored under streams that could support special status species or other resources of special value (e.g., riparian habitat). Where sensitive resources are identified within the ROW, such resources shall be avoided by minor rerouting of the pipeline, or construction during a time of year when sensitivity is low (e.g., to avoid nesting birds). Unless specifically approved by the CDFG, no construction activities shall be conducted within 15 feet of the top of bank or riparian stream or wetland vegetation. This 15-foot setback from riparian vegetation is considered an initial guideline that may be modified at specific sites following consultation with federal and State resource agencies, and as new information becomes available regarding wildlife habitat use.

SFPP shall acquire all permits and authorizations required by federal, State, regional and local jurisdictions to construct near areas with sensitive biological resources. Throughout the life of the project, additional species may be listed or designated as special status, and SFPP shall comply with any new requirements of the USFWS or CDFG for such species.

The Applicant shall perform no open trench crossings at any stream, wetland feature or other waters of the United States unless otherwise identified by a Streambed Alteration Agreement, U.S. Army Corps of Engineer 404 Permit, and/or any other required permits. Stream or wetland crossings shall be performed either by conventional directional bore or horizontal directional drilling.

For directional bores at streams that do not support sensitive wildlife resources within 500 feet of the construction site (e.g., at channelized or unvegetated waterways), a qualified biological monitor (BW-2a) shall visit the site at least once daily while boring or HDD operations are active, and provide a report to the CSLC.

Residual Impact. The primary mitigation measures to reduce potential impacts to wildlife habitat are pre-construction surveys to determine wildlife presence or absence (BW-1a, BW-3a, BW-3b, and BW-3c), appropriate demarking of resources (BW-1b), implementation of a Workers Environmental Awareness Plan (BW-1c), establishing construction exclusion zones (BW-1d), and minimizing disturbance to existing sensitive aquatic habitats by implementing boring techniques and construction setbacks (BW-1e). Implementation of these measures before and during construction of the Proposed Project would reduce potentially significant wildlife habitat impacts to less than significant levels.

Impact BW-2: Direct Wildlife Mortality

The direct loss of wildlife (e.g., small mammals, reptiles, and other less-mobile species) primarily would occur from construction activities associated with pipeline installation, staging areas, boring locations, and access roads. Direct mortality may also be associated with increased human activity, particularly involving wildlife habitat removal (Impact BW-1) and animal/vehicle collisions. (Potentially Significant, Class II)

Impact Discussion

Direct loss of small mammals, reptiles, and other less-mobile species could result from the use of construction equipment and vehicles during stringing and installation of the pipeline. Surface disturbance during construction and maintenance of the Proposed Project could result in a potential loss of less-mobile individual animals and/or ground nests. Clearing, grading, excavating, and/or burying habitats could also lead to mortality of small mammals, reptiles, and nesting birds with eggs or young. Potential impacts to special status wildlife species are discussed under Impact BW-4.

The majority of proposed pipeline route would be constructed along a variety of disturbed habitats. Most of the wildlife impacted by construction in these already disturbed areas are common, wide-ranging species. These common species are expected to quickly recolonize the corridor after construction and subsequent revegetation work is completed. Regardless, impacts to wildlife species, especially special status wildlife species, would be potentially significant (Class II).

Mitigation Measures for Impact BW-2: Direct Wildlife Mortality

BW-2a Reduce Direct Mortality to Wildlife. The Applicant shall impose the conditions defined below on all construction personnel. These requirements shall be addressed in the WEAP (Mitigation Measure BW-1c):

- Vehicles shall not exceed 15 mph on the entire ROW or along designated portions of access roads if approved by the CSLC monitor. These locations will be determined during pre-construction surveys and identified on project maps prior to construction.
- Litter or other debris that may attract animals shall be removed from the project area; organic waste shall be stored in enclosed receptacles, removed from the project site daily, and disposed of at a suitable waste facility.
- No pets will be allowed in the construction area, including access roads and staging areas.

- Construction crews will be educated regarding sensitive wildlife that could be encountered on highways and how to safely avoid them (BW-1c). Crew behavior shall be monitored by a qualified biologist from the CSLC (BW-2b, below).

BW-2b Employ Biological Monitors. CSLC will provide qualified biologists and resource specialists to monitor construction activities where sensitive resources have been identified on project maps. A biological resource monitor shall be present constantly for all water crossing (bores) with sensitive in-stream or downstream resources, and in areas where the presence of special status species or their habitat is known or suspected.

Monitors shall be hired and trained prior to construction and shall be responsible for pre-construction surveys, providing environmental awareness training to construction crews, staking sensitive resources, onsite monitoring, documentation of violations and compliance, coordination with contract compliance inspectors, and post-construction documentation. Resource monitors shall be familiar with the wildlife species and other sensitive biological resources in the general project area and qualified to recognize potential construction effects to these resources. Monitoring shall be particularly intensive near identified habitat for federal and State-listed species.

CSLC will provide full-time biological monitoring during all construction activities at stream or channel crossings that contains flowing water, sensitive species or their habitat (e.g., riparian, and wetland habitats). The CSLC monitor shall ensure that State and/or federal wetland protection guidelines are followed and that an adequate setback of at least 15 feet (or other distance mandated by CDFG or USFWS) is observed at wetland and/or riparian (woody vegetation) edges that provide suitable habitat for special status species.

Residual Impact. The purpose of these measures is to provide direction for specific methods or actions to reduce direct mortality of wildlife in the vicinity of the project. Effective application of the following mitigation measures (BW-2a and BW-2b), along with measures such as pre-construction surveys to determine wildlife presence or absence (BW-1a, BW-3a, BW-3b, and BW-3c), appropriate demarking of resources (BW-1b), implementation of a WEAP (BW-1c), and measures to limit access to the approved work zone (BW-1d) would result in little mortality among wildlife in the vicinity of the Proposed Project, thereby minimizing adverse impacts to wildlife to less than significant.

Impact BW-3: Habitat Removal or Disturbance of Special Status Wildlife Species

Construction and operational impacts of the Proposed Project could cause habitat removal or disturbance of special status wildlife species. (Potentially Significant, Class II)

Impact Discussion

Forty-two special status terrestrial wildlife species [impacts to special status fish species are addressed separately below (Marine and Aquatic Biology)] were identified as potentially occurring within the Proposed Project area (Appendix 1B). Of these 42 species, only 15 have the potential to be adversely impacted by the proposed pipeline project. These 15 species are either known to occur or have a high probability of occurring within or near the project segments. Protection recommendations for each of the 15 potentially affected wildlife special status species are presented below.

In addition to the 15 special status species potentially affected by the Proposed Project, special status raptors, protected under the Migratory Bird Treaty Act, would also be impacted if active raptor nests are destroyed or disturbed by project-related actions; Mitigation Measure BW-3b would protect these birds.

Mitigation for impacts to raptor species (BW-3c) is also presented below. Mitigation Measure BW-3d ensures that appropriate consultation with resource agencies will occur.

Mitigation Measures for Impact BW-3: Habitat Removal or Disturbance of Special Status Wildlife Species

BW-3a Protect Special Status Wildlife. Where construction will occur within or near known or potential special status species habitat, as defined below, the Applicant shall perform the actions defined in the following paragraphs.

- **California Red-Legged Frog.** In areas that are known to or could potentially support California red-legged frog habitat (identified in Appendix 1A), the Applicant shall perform pre-construction surveys (as required in Mitigation Measure BW-1a) to determine if this species is present at these and other locations that may support this species. Construction shall be timed to occur during the dry season (April 15 to October 15), or aestivation period to minimize take of dispersing frogs. If pre-construction surveys identify red-legged frogs within or adjacent to the ROW, no more than one week prior to the start of construction in these areas, the animals shall be captured by an agency-approved wildlife biologist. The captured individuals shall either be relocated to appropriate habitat outside of the disturbance corridor or shall be held in captivity until construction is completed through their habitat. The decision as to whether and where to relocate the animals shall be made by the wildlife biologist in consultation with the USFWS, based on site-specific conditions affecting the animals' safety. For the red-legged frog, mitigation activities would have to occur within the framework of the biological opinion (USFWS), a memorandum of understanding (between CDFG and USFWS), or other permit or instruction coming from USFWS or CDFG pursuant to federal or State endangered species legislation. The capture sites shall be monitored and appropriate measures taken during construction to ensure that any relocated animals do not move back into the construction corridor.
- **Giant Garter Snake.** In areas that are known to or potentially could support giant garter snake habitat (i.e., canal at MP 46.2, Water Crossing (WC) No. 30, and WC No. 31), the Applicant shall perform pre-construction surveys (as required in Mitigation Measure BW-1a) to determine if this species occurs in these areas. These surveys shall be conducted and coordinated within the guidelines and mandates provided in a Federal Biological Opinion for this species (as required in Mitigation Measure BW-3d). Construction in suitable uplands within 200 feet of aquatic habitat potentially occupied by giant garter snake shall be timed to occur between May 1 and October 1 when the garter snake is active to avoid direct take of individual snakes. If pre-construction surveys have identified giant garter snake within or adjacent to the ROW, then, no more than one week prior to the start of construction in these areas, the animals shall be captured by an agency-approved wildlife biologist. The captured individuals shall either be relocated to appropriate habitat outside of the disturbance corridor or held in captivity until construction is completed through their habitat. The decision of whether or not and where to relocate the animals shall be made by the wildlife biologist in consultation with the USFWS, based on site-specific conditions affecting the animals' safety. As with red-legged frogs, the mitigation activities for giant garter snake shall occur within the framework of the biological opinion (USFWS), a memorandum of understanding (between CDFG and USFWS), or other permit or instruction coming from USFWS or CDFG pursuant to federal or State endangered species legislation. The capture sites shall be monitored during construction to ensure that any relocated animals do not move back into the construction corridor. The construction area shall be monitored

during construction and appropriate measures taken to ensure that individuals of relocated species do not move into the construction corridor.

- **Special Status Vernal Pool Branchipods.** No construction activities will take place within 250 feet of occupied vernal pools or swales, as determined by the 2002 wet season protocol surveys (Appendix 1A) and the 2003 surveys currently being conducted by URS. These locations will be flagged and/or staked (BW-1b) by the designated biological monitors (BW-2b) prior to approved construction activities. The findings of the 2003 wet season vernal pool branchipod surveys, and any proposed reroutes to avoid newly described populations, will be submitted to CSLC and the appropriate resource agencies prior to any construction-related activities (BW-3d). In areas that support vernal pool habitat within 250 feet of the ROW but were not surveyed due to access denial (i.e., the area east of Vanden Road between MP 30.7 and 33.2 and areas north of Hay Rd. between MP 37.2 and 41.9), presence of vernal pool branchiopods was assumed and mitigation will be provided in the project's Biological Opinion (BW-3d).
- **Swainson's Hawk.** If project activities will occur during the breeding period (March 1 to September 15) qualified biologists shall conduct pre-construction surveys (BW-1a) within a 0.5 radius of the project ROW, at least two weeks prior to construction. If nesting Swainson's hawks are found, project activities within 0.25 miles of the project will be delayed until the young have fledged. Swainson's hawk nest sites within 0.5 miles of active construction (including those historic and recent observations near the ROW described in Table D.4-7), will be monitored by a qualified biologist to evaluate whether the construction activities are disturbing nesting hawks. If the nesting birds appear distressed, the monitor shall halt all construction activities within 0.5-mile of the nest site and CDFG will be contacted to identify appropriate contingency measures. If construction occurs between September 16 and February 28, no pre-construction surveys or other mitigation measures for Swainson's hawk will be necessary. The Applicant will consult with the CDFG to determine if mitigation for the temporary loss of Swainson's hawk foraging habitat will be required. CDFG considers loss of foraging habitat within a 10-mile radius of any active nest as an impact to this species.
- **Western Burrowing Owl.** The Applicant shall perform pre-construction surveys (BW-1a) for burrowing owls in all habitats along the ROW that are known to, or potentially support burrowing owl nesting sites (e.g., annual grassland, ruderal herbaceous, and cultivated fields). Burrowing owl surveys shall be conducted at all locations where burrowing owls have historically and recently been near the ROW, including those described in Table D.4-7.

Three owl burrows were observed within 250 feet of the ROW (URS 2002), and may be directly impacted by the Proposed Project. If pre-construction surveys determine that these or other owl burrows that occur within 250 feet of the project are active, SFPP will consult with CDFG as to the appropriate mitigation strategy and compensation ratio (as defined in the Burrowing Owl Mitigation Guidelines).

Potential burrowing owl habitat shall be surveyed by a qualified biologist to determine the presence of nesting burrowing owls. No more than two weeks before construction, a qualified biologist shall conduct a survey for occupied owl burrows within 500 feet of the construction corridor in areas that support potential owl habitat. The survey shall conform to California Burrowing Owl Consortium protocol (April 1993), which includes up to four surveys on different dates if there are active owl burrows present.

If construction is determined to not adversely affect occupied burrows or disrupt breeding behavior, construction may proceed without seasonal timing restrictions, though other applicable mitigation measures shall still be implemented.

If construction could adversely affect occupied burrows during the non-breeding season (August 31 through February 1), owls may be passively excluded from the burrow(s) using one-way doors. At least two suitable, unoccupied burrows (natural or artificial burrows — the latter constructed according to current design specifications) must exist within 300 feet of the occupied burrow before one-way doors are installed. Relocation burrows shall be in place at least one week before one-way doors are installed on occupied burrows. The one-way doors shall remain in place for 48 hours before burrows are excavated.

If construction activities are found to temporarily impact occupied burrows so as to disrupt reproductive behavior during the nesting season (February 1 through August 31), construction within 250 feet of occupied burrows shall be delayed until it is determined that the subject owls are not nesting or until a qualified biologist determines that juvenile owls are self sufficient and no longer using natal burrows as their primary shelter.

- **Salt Marsh Harvest Mouse and Suisun Ornate Shrew.** Where construction is proposed to occur within potential salt marsh harvest mouse habitat (i.e., salt marsh and alkali salt marsh habitat and areas described in Table D.4-7, the Applicant shall:
 - Conduct pre-construction presence-absence surveys (BW-1a).
 - Remove vegetation with handtools.
 - Segregate and replace topsoil.
 - Implement habitat restoration.

Vegetation within the construction ROW, pipe laydown areas, and directional drill work areas shall be removed using hand tools prior to the start of construction. Hand tools may include hand-operated mechanical trimming devices where appropriate. Colonies of invasive species such as perennial peppergrass (*Lepidium latifolium*) and common reed (*Phragmites australis*) shall be cleared and grubbed to remove the tubers and roots. All invasive wetland plant material shall be collected and properly disposed in a suitable upland location.

The upper six inches of soil excavated within salt marsh harvest mouse habitat shall be stockpiled separately and replaced on top of the backfilled material. All disturbed tidal marsh, brackish marsh and seasonal alkali marsh habitat shall be backfilled and graded to match the original elevations prior to construction.

The mitigation activities for salt marsh harvest mouse shall occur within the framework of a USFWS Biological Opinion (BW-3d), a memorandum of understanding (between CDFG and USFWS), or other permit or instruction coming from USFWS or CDFG pursuant to federal or State endangered species legislation. SFPP shall work with the USFWS to determine compensation for impacts to salt marsh harvest mouse habitat.

- **Western Pond Turtle.** Where construction is to occur near known or potential habitat for western pond turtle (i.e., pipeline water crossing and near ponds), pre-construction surveys shall be conducted to determine the presence or absence of this species (BW-1a). If pond turtles are observed, a determination shall be made in consultation with CDFG as to whether or not construction will adversely impact this species and what measures shall be implemented. Potential impacts to this species shall be minimized through implementation of the proposed water crossing techniques (HDD, bore) outlined in Mitigation Measure BW-1e.

BW-3b Protect Specified Bird Species. Where construction is proposed to occur near riparian or marsh habitats (e.g., tidal marsh, Alkali salt marsh, tidal sloughs, freshwater marsh) that support special-status bird species, as defined below, the Applicant shall limit construction periods to outside the respective breeding season of the affected species.

- **Tricolored Blackbird, Saltmarsh Common Yellowthroat, Suisun Song Sparrow.** No more than two weeks prior to construction between March 1 and August 31, for project activities within 250 feet of potential nesting habitat of the tricolored blackbird, saltmarsh common yellowthroat and Suisun song sparrow, pre-construction surveys shall be conducted (BW-1a) to determine the presence of nesting birds. If pre-nesting or nesting activity is identified, a determination shall be made in consultation with CDFG as to whether or not construction will adversely impact nesting birds. If it is determined that construction will impact nests or nesting behavior, construction within 250 feet of the nesting locations shall be delayed until juvenile birds have fledged. The 250 feet buffer is considered an initial guideline that may be modified at specific sites following consultation with CDFG.
- **California Black Rail.** To avoid disrupting nesting California black rails, construction activities in areas that provide potential habitat for these species (tidal marsh, Table D.4-7), shall occur outside of the nesting seasons for these species (March 1 through July 31). If construction activities take place during the nesting season and only after survey methodology is accepted by the USFWS, a qualified biologist shall conduct a pre-construction nest survey for the above-listed species, according to accepted protocols, within 700 feet of proposed construction activities. If active nests of either of the species are identified, construction within 700 feet of the nest(s) shall be delayed until the adult and/or juvenile rails are no longer using the nest as the center of their activity. Protocol-level presence/absence surveys may be required by the USFWS and/or CDFG.

BW-3c Protect Raptor Nests. The Applicant shall avoid disturbance to active raptor nests at all locations. Pre-construction surveys shall be performed in all areas to identify potential raptor nesting sites within or near the ROW.

No pre-construction surveys shall be required if construction activities are to occur only during the non-breeding season (September 1 through January 31). If, however, construction activities are scheduled to occur during the breeding season (February 1 through August 31), pre-construction surveys of all potentially active nest sites within 500 feet of the construction corridor shall be conducted in areas that may potentially have nesting raptors, including ground nesting raptor species such as northern harrier and short-eared owl. If surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation shall be required.

If active nests are found, a 500-foot, no-disturbance buffer shall be established around the active nest(s). The size of individual buffers can be adjusted, following a site evaluation by a qualified raptor biologist, which shall depend upon the presence of topographical features that obstruct the line of site from the construction activities to the nest or observations of the nesting pair during construction based on the level of ongoing disturbance (e.g., farming activities or road traffic) and the observed sensitivity of the birds. Site evaluations and buffer adjustments shall be made in consultation with the local CDFG representative. The portion of the project that is within the designated buffer shall be identified in the field by staking and flagging (BW-1b).

BW-3d Consultation to Minimize Impacts. If avoidance of sensitive wildlife species habitat is not feasible (e.g., by modifying the route or boring), the Applicant shall develop appropriate mitigation in consultation with the resource agencies (CDFG and USFWS). No construction activity shall be permitted until the applicable resource agencies determine that the proposed mitigation (in the Biological Opinion) will result in less than significant impacts to the affected species.

Residual Impact. The purpose of Mitigation Measure BW-3a is to define specific actions to reduce potential impacts to special status wildlife species in the vicinity of the project. Effective application of this measure and all other proposed mitigation measures (BW-1a through BW-3d) would reduce potential impacts to special status wildlife species to less than significant levels.

Impact BW-4: Wildlife Disturbance from Increased Human Presence

Human disturbance during project construction, maintenance, or the reclamation efforts could cause temporary displacement of some wildlife, avoidance of preferred habitat areas or reduced reproductive success. (Potentially Significant, Class II)

Impact Discussion

Construction, maintenance, or the reclamation efforts can create noise, dust, nighttime activities, lighting, etc. that could cause temporary displacement of some wildlife to habitat that may or may not be able to support additional individuals. These impacts can affect songbirds, small mammals, reptiles, and special status species. Project activities are likely to also temporarily displace a variety of wildlife from adjacent habitats, lowering the overall habitat availability and value of these areas. The project ROW and adjacent habitats are not likely to be completely abandoned by wildlife, but the effective use of these areas could be reduced during construction, depending on a number of factors such as the particular wildlife species, time of year, presence of topographic features, and amount of foliage and vegetation present. Since this effect could potentially be detrimental to some wildlife during their critical life stages and could increase competitive pressures among adjacent populations and habitats, the impact could be significant. Indirect impacts resulting from human disturbance during project construction, maintenance, or the reclamation process (due to heavy equipment operation and vehicular traffic, etc.) could, therefore, cause some wildlife displacement to other habitats, which may or may not be able to support additional animals. Impacts as a result of increased human disturbance also include reduced reproductive success in local wildlife populations, including songbirds, small mammals, reptiles, and special status species. Potential impacts to special status wildlife species are discussed above under Impact BW-3. Disturbance from increased human presence is considered potentially significant, but mitigable to less than significant levels (Class II).

Mitigation. Mitigation should include effective application of measures to conduct pre-construction surveys to determine wildlife presence or absence (BW-1a, BW-3a, BW-3b and BW-3c), to establish habitat setbacks (BW-1b) and appropriate construction timing and measures to limit access to the approved work zone (BW-1d, BW-1e), appropriately demark resources (BW-1b), and implement a WEAP (BW-1c).

Residual Impact. With effective application of the mitigation measures above (BW-1a, BW-1b, BW-1c, BW-1d, BW-1e, BW-3a, BW-3b and BW-3c) disturbance of wildlife in the vicinity of the Proposed Project would be reduced to less than significant levels.

Marine Biology

Impact BM-1: Construction Degrades Habitat for Marine and Aquatic Resources

Pipeline construction could degrade aquatic habitat and temporarily disrupt fish movement. (Potentially Significant, Class II or Less Than Significant, Class III)

Impact Discussion

Construction of the Proposed Project would result in crossing approximately 64 waterbodies, ranging from small creeks and sloughs to the Carquinez Strait. Construction methods proposed for the water crossings would be HDD, slick bore, cased bore, or open cut (BW-5: Minimize Disturbance at Water Crossings). These procedures are described in Section B.4.5 of the Project Description and in Section D.8 (Hydrology). Special status aquatic biota could be adversely impacted by construction at water crossings that occur within all the project segments. Special status aquatic species most likely to be adversely impacted at the project's water crossings include a variety of fishes (as discussed below under Marine and Aquatic Biology), amphibians, and reptiles that are known or expected to occur in the vicinity of the project segments including: Central steelhead, Chinook salmon, Delta smelt, Sacramento splittail, green sturgeon, river lamprey, Pacific lamprey, California red-legged frog, western pond turtle, and giant garter snake (Table D.4-7).

Open cut trenching of the pipeline could create direct construction impacts, especially where crossings are at locations with tidal flow. Pipeline construction at these locations could temporarily disrupt aquatic habitat and interfere with fish movement, a potentially significant (Class II) impact at Pacheco Creek, which while not always carrying water, has the potential for valuable aquatic habitat. Mitigation Measure HS-1d (Section D.8) would require an HDD crossing at Pacheco Creek.

Localized temporary disruption of aquatic habitat is considered an adverse but less than significant impact (Class III). Similarly, temporary disruption of fish movement is considered adverse but less than significant, because of the lack of quality upstream fish habitat (Class III).

HDD of waterways would not create construction disturbance to waterways unless an accidental release of drilling fluids were to occur. Construction activities adjacent to waterbodies has the potential to degrade the waterbodies by the introduction of sediment from erosion or by spills of fuel or other hazardous materials into the stream. Disturbance of sediment during construction could result in turbidity and degradation of tidal habitat downstream. Degradation of downstream habitat, even temporarily, could affect use of the area by sensitive fish species including the listed Sacramento splittail, and, potentially, Chinook salmon and steelhead. Degradation of downstream tidal habitat or any degradation of waterbodies used by listed fish species is considered a potentially significant impact that would be mitigable to less than significant levels (Class II) through implementation of Mitigation Measures HS-1a and HS-1b (see Section D.8, Hydrology and Water Quality). In addition, mitigation is required to reduce erosion and sedimentation (Mitigation Measure HS-1c) and to protect water quality during construction (compliance with NPDES requirements for preparation of a Storm-water Pollution Prevention Plan and a Hazardous Materials Management Plan).

As mentioned above, waterbodies have the potential to be degraded by the accidental release of drilling muds into the water column during HDD (this event is also known as a "frac-out"). Released drilling muds would cause a localized increase in turbidity. Fishes would probably avoid the disturbed area. A localized increase in turbidity would be an insignificant impact but if drilling muds flowed downstream and affected a wider area, habitat used by listed fish species would be degraded and sensitive life stages such as salmon smolt might be harmed by the turbid waters.

The potential also exists to degrade the aquatic habitat between through the discharge of hydrostatic test water into those streams. Hydrostatic test water could introduce contaminants such as metals into these streams. Because waterbodies, such as Peyton Slough, Pacheco Creek, Grayson Creek, and Walnut Creek, are used by listed fishes including Sacramento splittail, Chinook salmon, and steelhead, any degradation of the habitat of these species would be considered a potentially significant impact (Class II).

Mitigation Measure for Impact BM-1: Construction Effects on Marine and Aquatic Resources

Degradation of the habitat of listed fishes would be a significant adverse impact that could be mitigated to less than significant levels (Class II) by the implementation of Mitigation Measures HS-3a and HS-1d (contingency plan for unanticipated release of drilling fluids, and HDD crossing of Pacheco Creek, respectively). Habitat degradation from the introduction of toxic substances in hydrostatic test water would be mitigated to less than significant levels through implementation of Mitigation Measure HS-2a (in Section D.8, Hydrology and Water Quality).

Residual Impact. With the implementation of Mitigation Measure HS-2a, habitat degradation from the introduction of toxic substances in hydrostatic test water would be mitigated to less than significant levels. Compliance with NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan and Mitigation Measures HS-1a through HS-1d and HS-3a would minimize disruption to aquatic species and habitat to less than significant levels.

D.4.3.4 Impacts of Pipeline Accidents

Section D.2, Pipeline Safety and Risk of Accidents, describes the likelihood and frequency of anticipated pipeline accidents for the Proposed Project. Based on that data, this section considers the potential effects of an accident on biological resources.

Impact B-1: Pipeline Accident Affecting Biological Resources

Pipeline spills could degrade or alter habitat for wildlife, aquatic habitats and organisms, special status plants and their habitat, upland vegetation, and/or wetlands, potentially causing mortality and degradation of habitat to the point of precluding species re-establishment. (Significant, Class I or Potentially Significant, Class II or Less Than Significant, Class III)

Impact Discussion – Accident Effects on Vegetation and Wetlands

Larger spills, particularly in aquatic and wetland areas, could spread beyond the 200-foot-wide study area that has been surveyed for special status plants. The extent of the impacts to special status plants from a pipeline spill is difficult to quantify for several reasons: (1) the area of impact for larger spills, especially those in aquatic and wetland areas, would be difficult to determine but could be very large, (2) the occurrence of special status plants outside the Study Area or that may become established within the study area during the lifetime of the project is unknown, and (3) the direct effects of the spilled product on special status plant species is unknown. In addition, for larger spills, mitigation for impacts to special status plants may be infeasible due to difficulty in re-establishing plants and remediating soil contamination to pre-existing conditions over very large areas.

Section D.2 determines that a spill of 50 barrels or greater would be likely to occur once every 13 years. This size spill has the potential to damage valuable wetland and special plant habitat and mitigation for impacts to wetlands may be infeasible due to difficulty in re-establishing plants and remediating soil contamination to pre-existing conditions over very large areas. Spill impacts to wetlands may include plant mortality and soil contamination that may preclude re-establishment of the pre-existing wetland

vegetation. Larger spills, particularly in aquatic and wetland areas, may spread beyond the project area, potentially affecting tidal marshes and sloughs. As a result, the potential for a large spill to occur is considered a significant and unmitigable impact for wetlands and special status plants (Class I).

For spills that occur over an area where the occurrence of special status plants is known, and where mitigation is feasible and could be completed in a relatively short time period, impacts would be considered potentially significant, but mitigable to less than significant levels (Class II).

Impacts to upland vegetation may also occur from pipeline spills. These impacts may include plant mortality, and degradation of habitat precluding re-establishment of the pre-existing vegetation type. Spill impacts to non-sensitive upland vegetation types such as annual grassland, ruderal area, and cultivated field would be considered adverse, but not significant (Class III). Spill impacts to sensitive upland vegetation types including oak woodland, riparian forest and native grassland, however, would be considered potentially significant (Class II). Mitigation for spill impacts to sensitive upland vegetation would likely be feasible since the extent of impacts could more easily be determined following the spill.

Implementation of Mitigation Measure B-1a, requiring an addendum to SFPP's existing Emergency Response Plan and Emergency Plan regarding spill extent determination, cleanup and restoration measures for vegetation, will reduce spill impacts to these sensitive vegetation types to less than significant levels.

Impact Discussion – Pipeline Accident Effects on Wildlife and Aquatic Species

Leaks and spills from buried sections of the pipeline are expected to occur during the lifetime of the project but are expected to only affect localized areas of wildlife habitat. The level of impact from a pipeline leak or rupture would depend on the quantity and quality of wildlife habitat affected, the number and types of species present, the timing of the spill relative to seasonal wildlife activity (e.g., breeding season, peak of migratory stopovers, period of surface activity for sensitive reptiles and land mammals), the recovery rate for the affected resource, and the amount of cleanup activities required. Most small leaks are expected to generate minor localized, short term, insignificant impacts (Class III). However, if a spill were to occur at a stream crossing and if product were to reach riparian habitat downslope from the site of the leak, then locally significant (Class I or II) impacts could result.

If the spill from a ruptured pipeline were to enter a perennial or intermittent stream and reach downstream sensitive riparian or aquatic habitats, then impacts to wildlife could range from minor impacts (Class III) for small amounts of product and under conditions that minimize habitat damage, to significant (Class I or II) for large spills and damage to sensitive wildlife resources. Even a relatively small spill could result in significant impacts, either through direct effects on habitat and organisms or indirectly as a result of cleanup activities, which can profoundly affect a habitat.

In addition to adverse effects on habitat associated with spill and cleanup activities, spills from pipeline leaks and ruptures could also be expected to directly affect wildlife. Depending on the size and areal extent of the spill, an unknown number of birds, reptiles, and land mammals could be killed if they come into direct contact with the product. Aquatic reptiles, amphibians, and birds would be the most vulnerable to spills. They could be directly impacted by physical contact with product, ingestion of product, or loss of food and critical nesting and foraging habitat. Waterbirds can die from a combination of starvation and exposure brought on by a loss of appetite and sickness as a result of ingesting product while preening their feathers. Turtles, frogs, and aquatic larval stages of salamanders could be directly affected and die as a result of exposure to product. The eggs, larvae, and young of these animals have a low tolerance for product toxicity and have limited dispersal abilities. Aquatic habitats used for breeding by turtles, frogs and toads, and salamanders can become fouled as a result of a spill that in turn could prevent successful future reproductive success at affected locales by aquatic habitat dependent wildlife.

Mitigation measures cannot eliminate the likelihood that a pipeline accident could occur, but the adverse impacts of a spill on wildlife and wildlife habitat can be reduced through implementation of prompt and effective spill containment and cleanup.

Impact Discussion – Pipeline Accident Effects on Marine Biology

The probability of a large product spill from the Proposed Project is extremely low. It is unlikely that a spill of any size would occur in the portions of the pipeline near to tidal habitat during the 50-year life of the project and it is highly unlikely that a medium or large spill would occur. However, clearly anything greater than a very small spill has the potential to adversely affect marine organisms.

The effects of spilled petroleum product on aquatic biota depend on such factors as the physical and chemical properties of the product, specific environmental conditions at the time of the spill, and the species present and their sensitivities. Petroleum products are a complex mixture containing thousands of compounds, most of which are hydrocarbons. Other organic compounds and numerous metals or metal-like elements are also present. The hydrocarbons are of three general types: aliphatic, alicyclic, and aromatic. Their solubility in water generally decreases with increasing molecular weight, and the lighter weight ones are generally more volatile. Several of the petroleum hydrocarbons are also consumed by plants and animals, and a variety of organisms, ranging from bacteria to fish, have developed metabolic pathways for metabolizing these compounds (SAI, 1984).

Spilled petroleum products can alter aquatic habitats by filling crevices, changing substrate characteristics and coating hard substrates. Organisms can be affected physically through smothering, interference with movements (especially benthic organisms), coating of external surfaces with black coloration (leading to increased solar heat gain), and fouling of insulating body coverings (birds and mammals). Toxicity can occur via absorption through the body surface (skin, gills, etc.) or via ingestion. Biological oxidation (through metabolism) can produce products more toxic than the original compounds. Acute toxicity is unlikely for fish, especially after some weathering. Sublethal effects include reduced reproductive success, narcosis, interference with movement, and disruption of chemosensory function (i.e., similar to human smell or taste).

A product spill could enter aquatic habitats through direct entry, runoff from upland areas within the watershed (especially during storm runoff), and/or contamination of groundwater feeding streams. Direct entry of petroleum into dry stream channels would have no immediate direct impact on aquatic organisms. Petroleum remaining in the habitat would lose its toxicity through weathering, but could adversely affect organisms colonizing these areas during the wet season through physical and chemical alteration of the habitat. Impacts on dry stream channels are generally not expected to be significant (Class III), especially with at least some cleanup. Cleanup by excavation to remove contaminated sediments activities, however, could also alter habitats. For small spills requiring little disturbance of the habitat structure, impacts would not be significant (Class III). For spills that affect large areas of stream habitat, impacts could be significant (Class II or possibly Class I) if bed and bank alteration resulting from contamination or cleanup activities reduces habitat quality. Impacts of habitat alteration during cleanup could be mitigated by implementation of minimal-impact cleanup techniques and restoration of habitat structure after cleanup is completed. In some instances, leaving the spilled petroleum product in the habitat may minimize impacts on aquatic resources. See System Safety Mitigation Measures S-1a through S-2g.

Impacts on resident biota would be short- to long-term, depending on the amount of product spilled, specific environmental conditions at the time, and containment and cleanup measures taken. For most aquatic species, impacts would be adverse, but minor and local (Class III), since recolonization would be rapid as long as habitat structure is not greatly modified. The loss of fish populations (see Section D.4.1), substantial habitat alteration (physical and biological), or entry of large amounts of product into flowing

streams could have significant short- to long-term, adverse impacts (Class I or II). Areas where significant adverse impacts could occur include, but are not limited to the Carquinez Strait, Peyton Slough, Walnut Creek, Suisun Marsh, Peytonia Slough, Cordelia Slough/Creek, Ulitas Creek, Hass Creek, Putah Creek, Willow Creek, Yolo Bypass, and the Sacramento River Toe Drain.

The consequences of an actual large oil spill in the project area were documented for the Shell Martinez spill (Fischel and Robilliard, 1991). In April 1988, approximately 9,500 barrels of San Joaquin Valley crude oil were accidentally released from an above ground storage tank at the Shell Oil Company's Martinez Manufacturing Complex. The crude oil flowed into Peyton Slough and Marsh and entered Suisun Bay and Carquinez Strait. Shell initiated cleanup activities as soon as the spill was discovered. Approximately 148 acres of marsh shoreline were oiled by the spill, of which 32 acres were heavily oiled (almost completely covered with oil), 15 acres were moderately oiled, and 98 acres were lightly oiled (small isolated patches of oil). Approximately four acres of slough banks were oiled. Surveys after the spill determined that benthic organisms were absent in the most heavily oiled portions of Peyton Slough. The abundance and number of species of fishes and epibenthic invertebrates were lower in the oiled sloughs than in unoiled areas. Clams from Peyton Slough had higher concentrations of petroleum aromatic hydrocarbons in their tissues than clams from other areas. Furthermore, fish tissue analysis indicated that enzymes responsible for hydrocarbon metabolism were elevated in fishes collected from Peyton Slough and offshore Peyton Slough. Although the ecological implications of higher levels of petroleum metabolizing enzymes is not known, it can be presumed that if a fish must devote energy to metabolizing hydrocarbons there will be an energetic cost that might result in lower reproductive success or ability to resist infection.

Laboratory tests have demonstrated the toxicity of petroleum hydrocarbons to many aquatic organisms. Soluble aromatic compounds in crude oil or product generally are toxic to marine organisms at concentrations of 0.1 to 100 parts per million (ppm). Planktonic larval stages are usually the most sensitive to petroleum. Very low levels of petroleum, below 0.01 ppm can affect such delicate organisms as fish larvae (NRC, 1985).

Biological impacts of petroleum product spills include lethal and sublethal effects and indirect effects resulting from habitat alteration and/or destruction of contamination of a population's food supply. Direct lethal effects may be chemical (such as poisoning by contact or ingestion) or physical (such as coating or smothering with product). A second level of interaction is sublethal effects. Sublethal effects are those which do not kill an individual but which render it less able to reproduce successfully, resist disease, or to compete with other species.

Because of the unique and sensitive aquatic ecosystem in Carquinez Strait, Suisun Bay, and the sloughs and marshes adjacent to Suisun Bay, any sizable product spill clearly could have significant adverse impacts to marine resources. A spill that spread to a large portion of the aquatic habitat in these areas could result in a substantial long-term deterioration of aquatic habitat, or could cause a temporary alteration or loss of habitat important for listed species. Contact of the Bay and sloughs by petroleum products could result in avoidance by a listed species, or could cause increased mortality or lowered reproductive success. A spill in Suisun Bay is of particular concern because the entrapment zone, critical to the food web of several sensitive fish species, is usually located there. The food web of Suisun Bay has already been severely affected by the introduction of the Asian clam and other invasive species. A large product spill could add to those impacts.

Listed fish species likely to be affected by a spill that released product into Carquinez Strait, Suisun Bay, or any of the adjacent sloughs include Central Valley steelhead (federal threatened), winter run Chinook salmon (federal and State endangered), spring run Chinook salmon (federal and State endangered), Sacramento splittail (federal threatened) and Delta smelt (federal and State threatened). Other sensitive fish species that

would be affected by a large product spill include fall/late fall run Chinook salmon (federal candidate for listing), longfin smelt (California Species of Special Concern), river lamprey (*Lampetra ayersi*) (California Species of Special Concern), and green sturgeon (California Species of Special Concern). If the release of product were relatively small (less than 50 barrels), impacts likely could be reduced to less than significant levels (Class II) through implementation of Mitigation Measures S-1a through S-2g and B-1a.

For larger spills (greater than 50 barrels), it is unlikely that spilled product could be contained and cleaned up before sensitive aquatic habitats were contacted. The EIR for Consideration of a New Lease for Unocal's Marine Terminal at Oleum modeled two 1,000-barrel spills from a tanker in Carquinez Strait (Chambers Group, 1994). These spills originated just west of the existing pipeline crossing of Carquinez Strait and probably represent the range of effects that would be expected should a pipeline rupture result in a large release of product into Carquinez Strait. In one scenario (Bay Scenario No. 5) the movement of oil from a spill at the eastern end of Carquinez Strait was modeled for February wind conditions and a flood tide. Floating oil covered most of Suisun Bay. Beached oil occurred on both the northern and southern shores of Suisun Bay. In the second modeled spill (Bay Scenario No. 6) of a spill under July wind and flood tide conditions, floating oil was only along the southern margin of Suisun Bay and oil beached only along the southern shore. In both spills, it is clear that designated Critical Habitat of Delta smelt, Chinook salmon and Central Valley steelhead would be contacted by oil. Sloughs used by juvenile salmon and steelhead as well as by Delta smelt, Sacramento splittail and other sensitive species would be oiled. It is unlikely that for a large or even medium spill, oil could be contained before it contacted sensitive aquatic habitats. Effects from a product spill would be similar, though would be slightly less persistent. Therefore a medium or larger product spill has the potential for significant unmitigable impacts to marine resources (Class I).

Although both modeled spills were on flood tides and resulted in oil being confined to Carquinez Strait and Suisun Bay, under conditions of ebbing tide and high Delta outflow, product from a large spill clearly could enter San Pablo Bay. Sensitive habitats in San Pablo Bay include extensive shallow water habitat, marshes and mudflats on the northern side and large eelgrass beds in the southwestern portion.

Mitigation Measure for B-1: Pipeline Accident Affecting Biological Resources

B-1a Pipeline Spill Mitigation for Biological Resources. SFPP shall minimize pipeline spill impacts to sensitive plant species and communities and sensitive wildlife resource areas within the project area including lakes, tidally-influenced areas, and riparian and freshwater habitats by:

- Development and implementation of spill cleanup measures to be incorporated as a supplement to the existing Emergency Response Plan (in conjunction with Mitigation Measure S-2d), including cleanup and containment procedures, restoration and monitoring requirements.
- Supervision and verification of the implementation of these measures by the Environmental Monitor.

Prior to operation of the pipeline, spill cleanup and restoration measures for vegetation and wetlands shall be incorporated as a supplement to the existing Emergency Response Plan. These measures shall be designed to protect special status plant species and sensitive vegetation types from spill damage, to minimize damage from response and repair operations, and to restore them to pre-spill conditions. These measures shall be consistent with, and incorporate relevant measures from, Mitigation Measures BB-2a through BB-6a. These measures shall discuss, at a minimum, the following:

- Emergency diversion and containment measures to minimize the flow of product into known colonies of sensitive plant species or wetlands in the vicinity of the pipeline.
- Equipment storage areas and mobilization procedures for each portion of the pipeline.
- Non-destructive cleanup and restoration procedures.
- All cleanup and restoration work shall be supervised and verified by the Environmental Monitor.

The extent of a spill shall be determined through water quality and soil contamination testing in order to determine the amount of sensitive vegetation types and species that may have been affected.

To mitigate the potential loss of special status plant species resulting from a spill, a Rare Plant Mitigation Plan shall be developed in coordination with USFWS and CDFG to, at a minimum, re-establish known populations of special status plant species removed or damaged by the spill or cleanup activities, including areas outside the ROW. The plan shall include affected habitat monitoring for at least five years, or as specified by the responsible agencies, to evaluate habitat degradation and to determine if the population recovers from the spill. The plan will describe a contingency plan that, if the monitoring shows that the species population has been extirpated, a habitat restoration and species reintroduction program shall be implemented using the most suitable genetic source.

The Emergency Response Plan shall also provide stipulations for development and implementation of site-specific Habitat Conservation Plans (HCPs) and other site-specific and species-specific measures appropriate for mitigating impacts on local populations of sensitive wildlife species. Access and egress points, staging areas, and material stockpile areas that avoid sensitive habitats shall be identified. The OSCP shall include species- and site-specific procedures for collection, transportation, and treatment of oiled wildlife, particularly sensitive species, and shall include provisions such as bonding to ensure funding for required cleanup measures.

Describe in the Emergency Response Plan, where feasible, low-impact site-specific cleanup techniques such as hand-cutting contaminated vegetation and using low-pressure water flushing from boats to remove product from particularly sensitive wildlife habitats (e.g., tidal and freshwater marsh, riparian woodlands, lakes, and streams). More destructive techniques, such as shoveling, bulldozing, raking, and draglining can cause more damage to a sensitive habitat than the spill itself. The particular site-specific cleanup methods used in each case shall be determined by the Incident Commander in consultation with the appropriate agencies (e.g., USFWS and CDFG). The OSCP shall evaluate the no-cleanup option for ecologically vulnerable habitats, such as riparian.

The Emergency Response Plan shall identify appropriately trained personnel and equipment to respond to a product spill, pursuant to 40 CFR 194 - *Response Plans for Onshore Pipelines*. In addition, pursuant to Title 14, Subdivision 4 (Office of Oil Spill Prevention and Response) of the California Department of Fish and Game Government Code, the OSCP shall discuss procedures that clearly outline how rehabilitation of oiled wildlife will be accomplished and assure by contract or other approved means, the equipment and personnel necessary to implement these procedures. The Emergency Response Plan shall incorporate wildlife contingency measures, including provision of:

- Specifics of how to deal with oiled wildlife, both terrestrial and aquatic.

- A list of names and telephone numbers of persons who are expert in the rehabilitation of oiled wildlife.
- Locations and response times of facilities and persons for responding to oiled wildlife, creating facilities if necessary.
- Indication of an ability to rehabilitate oiled wildlife over the long term, if necessary.

To mitigate impact to wetlands, trees, and riparian vegetation due to a spill or cleanup activities, restoration and compensation measures described in Mitigation Measures BB-2a, BB-3a, BB-5a, and BB-5b shall be implemented to the maximum extent that they are in agreement with this mitigation measure. To mitigate for impacts to all vegetation types and sensitive plant species from weed invasion due to cleanup activities, weed monitoring and control measures described in Mitigation Measure BB-6a shall be implemented to the maximum extent that they are in agreement with this mitigation measure.

Residual Impact. Implementation of all construction mitigation measures (Section D.4.3.3 above) and Mitigation Measure B-1a, requiring a supplement to the existing Emergency Response Plan regarding spill extent determination, cleanup and restoration measures, would reduce impacts to documented special status plant occurrences, upland vegetation, and/or wetlands within the extent of the spill to less than significant levels. However, impacts to biological resources, especially wetlands and aquatic resources, from a large spill (greater than 50 barrels) are considered to be significant and unmitigable. **A Statement of Overriding Considerations would be required for project approval.**

Impact B-2: Pipeline Accident Response Effects on Biological Resources

Impacts to wetlands, special status plants and wildlife, and upland vegetation may occur during cleanup activities following a pipeline spill. (Significant, Class I or Potentially Significant, Class II)

Impact Discussion

The severity of impacts to biological resources from spill response activities would range from less than significant (Class III) for small spills in areas where resources are well-defined and can be avoided, to significant and unmitigable (Class I) where clean up activities could affect a large extent of valuable tidal or marsh habitat.

Accident response actions could affect biological resources through the following activities: (1) overland travel resulting in crushing individuals, vegetation removal, and degrading habitat, (2) access to, excavation, and re-installation of the pipeline resulting in plant removal, potential hydrologic alteration, including erosion/sedimentation onto individuals or habitat, (2) contaminated soil removal resulting in plant and seedbank removal, and (3) soil disturbance facilitating invasion by weeds. Because the effectiveness of cleanup of large spills in areas where special status plants occur cannot be determined, indirect impacts of cleanup activities on wetlands and special status plant populations is considered to be significant and unmitigable (Class I). However, a smaller spill occurring in an area where the occurrence of special status plants is known would likely result in indirect impacts that are significant, but mitigable (Class II).

Cleanup impacts to vegetation and seed banks in annual grassland, ruderal area, and cultivated field would be considered adverse, but not significant (Class III). However, cleanup impacts resulting in weed invasion and removal of vegetation and seedbank within sensitive vegetation types (oak woodland and riparian forest) would be considered significant, but mitigable (Class II) since the extent of impacts could be determined following the spill. Larger spills, particularly in aquatic and wetland areas, may spread

beyond the project area. The size of spill that may extend outside the project area is unknown. Indirect impacts extend over an even larger area. For larger spills, mitigation for indirect impacts to wetlands may be infeasible, due to difficulty in re-establishing plants in areas of overland travel and controlling weeds over very large areas. Therefore, potential direct impacts from large spills would be considered significant and unmitigable (Class I). Cleanup impacts to wetlands from small spills would be considered significant, but mitigable (Class II) since the mitigation on a small scale is feasible and could be completed in a relatively short time period.

Mitigation. Implementation of all construction mitigation measures (see Section D.4.3.3) and Mitigation Measure B-1a, requiring a supplement to the existing Emergency Response Plan, would reduce impacts of small to medium spills to documented special status plant occurrences, upland vegetation, and/or wetlands within the extent of the spill to less than significant levels. However, indirect impacts of cleanup activities on undocumented special status plant populations and direct impacts on wetland areas are considered to be significant and unmitigable.

Residual Impact. Implementation of the above mitigation measures would reduce impacts of small to medium spills to documented special status plant occurrences, upland vegetation, and/or wetlands within the extent of the spill to less than significant levels. However, indirect impacts of cleanup activities on undocumented special status plant populations and direct impacts on wetland areas are considered to be significant and unmitigable. **A Statement of Overriding Considerations would be required for project approval.**

D.4.3.5 Impacts of Pipeline Operation

Impact B-3: Pipeline Maintenance And Repair Activities Could Affect Sensitive Species and Habitats

Impacts to special status wildlife or plant species and upland vegetation or their habitats and/or to wetlands may occur due to overland travel pipeline maintenance and repair. (Potentially Significant, Class II)

Impact Discussion

Impacts from pipeline operation could result from (1) crushing vegetation, (2) causing a hydrologic alteration wetlands by compacting the soil or creating ponded areas by driving in wet soil conditions, (3) causing erosion/sedimentation into habitat due to driving in wet soil conditions, and (4) facilitating weed invasions due to ground disturbance or seed import. These impacts would be considered significant, but mitigable to less than significant levels (Class II).

Impacts to special status plant species and upland vegetation or their habitats and/or wetlands may occur during pipeline repair work. Pipeline repair would generally involve excavation of soil and exposure of the pipeline and backfilling following repair. This would cause temporary vegetation removal and soil disturbance. These impacts to special status plant species could result from (1) removal of sensitive vegetation types (e.g., oak woodland, riparian forests, and/or wetland), individuals, seeds, or their habitat during excavation, (2) erosion/sedimentation during soil excavation or backfilling, (3) deposition of hazardous substances (e.g., diesel fuel), (4) hydrologic alteration to wetlands or to special status wetland plant species from improper backfilling, compaction or re-contouring, and (5) facilitating weed invasions due to soil disturbance and seed import. These impacts would be considered significant, but mitigable (Class II).

Potential impacts on wildlife from operation of the proposed pipeline include disruption of wildlife during aerial and ground inspections of the pipeline ROW and maintenance and repair of valves. Normal operation of the pipeline facilities could disrupt wildlife that occurs in adjacent habitats through noise and occasional increased human activity. Noise generated during routine aerial and ground inspections of the pipeline would last for only a few minutes at any point along the pipeline route and would tend to be indistinguishable from other types of aerial and vehicular traffic noises that already occur in these areas. Thus, normal operation and inspection of the pipelines and facilities is expected to have less than significant (Class III) impacts on wildlife. Pipeline repairs would have impacts similar to those described for construction, but they would be more localized. Since the location and timing of a major repair are impossible to predict, impacts on wildlife from repair operations could range from short-term, less than significant (Class III) if no sensitive wildlife resources are present to potentially significant (Class II) if sensitive wildlife resources are present. Significant effects of repair operations could be avoided by implementation of mitigation measures developed for pipeline construction (BW-1a through BW-3d), measures for accidents/operation (B-1a), and Mitigation Measure B-3a below.

Normal pipeline operations would not be expected to have any impacts to marine resources. However, during pipeline maintenance or repair actions, SFPP should implement all mitigation defined in Section D.4.3.3 for pipeline construction to ensure that impacts would be less than significant.

Mitigation Measure for Impact B-3: Pipeline Maintenance and Repair Activities Could Affect Sensitive Species and Habitats

B-3a Pipeline Operations and Maintenance. SFPP shall avoid, minimize, and compensate for pipeline operation and maintenance impacts to sensitive plant species and vegetation types by:

- Development and implementation of measures to avoid sensitive wildlife and plant species and habitats during pipeline operations and maintenance, to be incorporated as an addendum to the existing Operation and Maintenance Plan, including restrictions on off-road vehicular travel, mapping and avoidance of sensitive resources and record keeping of monitoring activities.
- Restoration of sensitive vegetation types due to pipeline repair in accordance with other relevant mitigation measures.

Prior to operation of the pipeline, measures to reduce and mitigate for pipeline operation and maintenance impacts to vegetation and wetlands shall be incorporated into the Operation and Maintenance Plan and approved by CSLC. These measures will be designed to avoid and minimize impacts to special status wildlife and plant species and sensitive vegetation types during routine monitoring of the pipeline and to restore these sensitive resources following necessary pipeline repair work. These measures shall be consistent with, and incorporate relevant measures from, Mitigation Measures BB-2a through BB-6a.

Measures to minimize impacts to sensitive plant species and vegetation types, including wetlands, from overland travel during routine pipeline monitoring shall include, at a minimum, the following:

- Develop routine pipeline monitoring methods, including proposed travel routes, that limit off-road vehicular travel.
- Create a map of the pipeline route depicting the location of all special status plant species and wetlands to be used during necessary off-road vehicular travel to avoid these resources.

- Off-road vehicular travel must be recorded in writing, including purpose for off-road vehicular travel, a map of the route taken, date, and a description of the sensitive resources avoided.
- Off-road vehicular travel shall be prohibited during rainstorms or within a two-week period following any precipitation event.
- Prohibit disturbance and clearing of riparian and wetland vegetation during inspections.

To minimize impacts to biological resources and wetlands during planned pipeline repair work, travel and work areas shall be flagged and fenced prior to repair work to identify and avoid impacts to sensitive habitats as depicted on the pipeline map. In addition, Mitigation Measures BB-2a through BB-6a shall be applied to the extent that they are in agreement with this mitigation measure. SFPP shall maintain records of mitigation implementation on file at its pipeline maintenance office.

To mitigate the loss of wetlands, trees, and riparian vegetation during pipeline repair work involving excavation, the restoration and compensation measures described in Mitigation Measures BB-2a, BB-3a, BB-5a and BB-5b shall be implemented during and after repair work.

Residual Impact. Because pipeline operation and maintenance can create the same impacts as pipeline construction, all relevant construction measures should be implemented. Implementation of Mitigation Measure B-3a, requiring development of an addendum to the Operations Plan that would include restrictions on driving routes and timing, along with other construction measures, would reduce these impacts to less than significant levels.

D.4.3.6 Impacts by Segment

In addition to the general construction, operation, and spill impacts described above, segment-specific impacts could occur for particular habitats and species. These segment-specific descriptions of the impacts detailed above are summarized below. Section 4.2.1 describes the environmental setting of each segment, including any listed species. Appendix 1 describes these listed species (Appendix 1A), lists their status and likelihood of occurrence within each segment (Appendix 1B), and shows any impacts to wetlands (Appendix 1C through 1E).

Impacts Applicable to All Segments

All construction impacts would occur in all segments. The impacts and mitigation measure that are detailed in Sections D.4.3.3 through D.4.3.5 are summarized here, and then in the segment discussions that follow, the specific resources that may be affected are described. Impacts and mitigation for sensitive plants and wetlands for the Proposed Project are as follows:

- Impact BB-1 is the potential for construction to cause sedimentation, erosion, or contamination that could affect special status plants or wetlands. This impact would be reduced to less than significant levels with implementation of the mitigation measure recommended in Section D.8, Hydrology and Water Quality (Mitigation Measures HS-1c) and compliance with NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan to reduce erosion and prevent spills from construction equipment.
- Impact BB-2 is construction effects on rare or special status plants, mitigable to less than significant levels with implementation of Mitigation BB-2a, which calls for avoidance, and protection of rare plants during construction.

- Impact BB-3 is the temporary loss of vegetation during construction, a potentially significant impact that would be less than significant with implementation of Mitigation Measure BB-3a (tree avoidance and replacement).
- Impact BB-4 would be less than significant (no mitigation required) and is the permanent loss of small amounts of vegetation at aboveground facilities and valves.
- Impact BB-5 is removal of vegetation or altered hydrology in wetlands, potentially significant but mitigable to less than significant levels with implementation of Mitigation Measures BB-5a (wetland avoidance and restoration), BB-5b (trench backfill requirements and topographic restoration), and BB-5c (riparian avoidance and restoration).
- Impact BB-6 is the potential for weed invasion to follow construction; Mitigation Measure BB-6a (weed management) would ensure protection against weeds.

There are four impacts for wildlife and aquatic species, and 11 mitigation measures, summarized as follows:

- Impact BW-1 would result from loss of wildlife habitat during construction, and is mitigable to less than significant levels with implementation of Mitigation Measures BW-1a (pre-construction surveys), BW-1b (maintenance of buffer zones), BW-1c (worker training), BW-1d (confining construction activity to the defined ROW), and BW-1e (minimizing disturbance at water crossings).
- Impact BW-2 is direct wildlife mortality during construction, mitigable with implementation of Mitigation Measures BW-2a and BW-2b (reduce direct mortality, and employ biological monitors).
- Impact BW-3 addresses the potential for special status wildlife species to be affected by construction, and would be mitigable to less than significant levels with implementation of Mitigation Measures BW-3a through BW-3d which would protect these species.
- Impact BW-4 is wildlife disturbance from human presence; this impact would be mitigated to less than significant levels with implementation of all wildlife measures described above.

Construction impacts to marine biology are of special concern in the project area. These impacts would be reduced to less than significant levels with implementation of sedimentation control measures (HS-1a, HS-1b, and HS-1d), erosion control and water quality protection measures (HS-1c and compliance with NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan), and a plan to respond to drilling fluid releases in waterways (HS-3a).

The discussions in Sections D.4.3.4 and D.4.3.5 above apply to all segments and no segment-specific discussion is presented for these impacts. Pipeline operation and maintenance and potential accidents would have similar impacts in all segments, and the same mitigation measures would apply to all resources. Impact B-1 (pipeline accidents) would be reduced in severity with implementation of Mitigation Measure B-1a, but impacts to wetlands, special status plants, and marine/aquatic resources would still be significant (Class I). Impact B-2 would result from cleanup of a spill and has the potential to create a significant impact (Class I), even though Mitigation Measure B-2a would reduce most impacts to less than significant levels. Impact B-3 (pipeline maintenance and repair) would be mitigated with implementation of Mitigation Measure B-3a (pipeline operations and maintenance), reducing impacts to less than significant levels. The range of Impact BB-5 resulting in wetland disturbance would vary depending on the amount of wetland area within the segment. Table D.4-11 shows the types of wetlands impacted by segment.

Segment 1 (MP 0–6.1) – Contra Costa County and Carquinez Strait

Vegetation and Wetlands

Surveys for special status plant species in Segment 1 located one special status wetland plant species, Mason's lilaeopsis, east of the ROW in Peyton Slough marsh. An indirect impact to this species and/or habitat degradation within wetlands adjacent to the construction areas could result from construction and related

activities such as erosion/sedimentation of clean and/or contaminated soils or deposition of hazardous substances (e.g., diesel fuel) within the Rhodia Plant area and into Peyton Slough east of the ROW (Impact BB-1). These impacts are considered potentially significant (Class II), mitigable to less than significant levels with implementation of Mitigation Measure BB-2a and BB-5a.

Table D.4-11. Wetland Area Effects by Segment (acres)

Jurisdictional Type	1 MP 0.0-6.1	2 MP 6.1-17.6	3 MP 17.6-24.5	4 MP 24.5-30.7	5 MP 30.7-65.1	6 MP 65.1-69.9	7 Wickland
Freshwater marsh	1.70	0.02	-	-	0.35	0.11	-
Seasonal marsh	0.26	1.08	0.16	0.84	41.86	0.04	-
Seasonal alkali marsh	4.85	0.11	10.06	-	-	-	-
Brackish marsh	0.48	0.20	0.70	-	-	-	-
Seasonal seep	-	0.15	-	-	-	-	-
Riparian forest	-	-	-	-	0.67	0.22	-
Riparian scrub	-	-	-	-	0.28	-	-
Vernal pool	-	-	-	-	0.77	-	-
Total wetlands	7.29	1.56	10.92	0.84	43.93	0.37	0.0
Non-wetland waters of the U.S.	0.81	0.12	0.94	0.02	0.78	0.47	-
Total jurisdictional waters	8.10	1.68	11.86	0.86	44.71	0.84	0.0
Non-jurisdictional waters	0.16	0.03	0.18	0.29	1.04	-	-

As discussed under Impact BB-2, botanical surveys of the project area conducted by URS were not appropriately timed with the blooming period of one special status plant species, fragrant fritillary, which has the potential to occur along this segment. Although the cited blooming period for this species is February through April, the optimum blooming period is in mid-March. However, the earliest botanical survey conducted by URS was in early April, which may not have been early enough to determine the presence or absence of this species within the project area. Construction and related activities causing direct impact to this species or its habitat and would be considered potentially significant, but mitigable to less than significant with implementation of Mitigation Measure BB-2a.

Impacts to upland vegetation types such as annual grassland, and ruderal area would occur due to vegetation removal within the 100-foot-wide ROW, one staging area, four HDD work areas, and two HDD pipeline laydown areas, and due to trenching along the pipeline route and excavation of fringe wetlands associated with the open cut crossing of Pacheco Creek (MP 1.6). This temporary impact to annual grasslands, and ruderal area would be considered adverse, but not significant (Class III). Impacts to wetland areas (Impact BB-5) would be potentially significant (Class II), but mitigable to less than significant with the implementation of Mitigation Measure BB-5a, BB-5b, and BB-5c.

Impacts could occur due to a permanent loss of vegetation at two motor operated valve locations (at MP 0.0 and MP 4.8). Due to the small size of these installations, however, valve installation would be considered adverse, but less than significant and no mitigation is required (Class III).

Pipeline construction would result in temporary and long-term impacts to 7.3 acres of jurisdictional wetlands within and adjacent to pipeline construction areas (see Impact BB-5 in Section 4.3.3 and Appendix 1). Temporary impacts could be caused by interception and detention of groundwater or surface water within the excavated trench, thus reducing the hydrologic input to the adjacent wetland. Long-term hydrologic change to wetlands could result from trench backfill and topographic restoration activities. Backfill material

and methods would affect wetland hydrology by altering surface and subsurface flow. For example, the pipeline backfill materials (such as gravel or coarse-textured non-native fill) could be more or less permeable than native materials. Surface alteration may impede or accelerate drainage. Compaction and settlement of backfill may create ditches along the pipeline. Excess backfill may restrict surface or groundwater connections to wetlands. Impacts to the hydrologic function of wetlands would be considered potentially significant (Class II), but mitigable to less than significant with the implementation of Mitigation Measure BB-5b.

Construction-related disturbance of wetlands and upland vegetation would provide an opportunity and seedbed for the invasion of weeds (see Impact BB-6 in Section 4.3.3). Weeds are non-native opportunists that have developed reproductive features that give them a competitive advantage over many native plants. The introduction or expansion of exotic species is deleterious to native vegetation types. Impacts of construction on weed free wetland areas (and areas with slight infestations) would be considered potentially significant (Class II).

Finally, potential direct and indirect impacts to upland vegetation, and/or wetlands due to overland travel during pipeline monitoring or pipeline repair (Impact B-3) could occur (Class II). Implementation of the Mitigation Measure BB-3a would reduce these impacts to less than significant levels.

Carquinez Strait Crossing

Phase 2. Impacts to special status plant species, upland vegetation types, and wetlands due to Phase 2 pipeline construction activities within Segment 1, consisting of the pipeline installation under the Carquinez Strait using HDD, are described below, along with associated mitigation measures.

Impacts to individuals or known habitats of rare, threatened, or endangered plant species would be considered a significant impact. Surveys for special status plant species located one special status wetland plant species, Mason's lilaeopsis, west of the ROW in Peyton Slough. An indirect impact to this occurrence is possible where construction and related activities (within the HDD work area) may impact wetland habitat due to erosion/sedimentation or deposition of hazardous substances (e.g., diesel fuel). Habitat degradation within wetlands due to sedimentation, erosion, or contamination would be similar to Phase 1. As detailed in Impact BB-1, construction impacts on these sensitive plant species and wetlands are considered potentially significant and mitigation would be required prior to Phase 2 construction.

Potential direct impact due to temporary removal of rare plants not surveyed (Impact BB-2) would be similar to Phase 1 (above). Impacts to upland vegetation types such as ruderal area may occur due to vegetation disturbance within the one-mile-long, 50-foot-wide pipeline laydown area. This temporary impact to ruderal area due to vegetation removal (Impact BB-3) would likely be considered adverse, but not significant. Impacts to wetlands (seasonal alkali marsh and salt marsh) would occur due to vegetation removal within the two HDD work areas, resulting in a temporary loss of vegetation (Impact BB-6). Impacts to wetlands would also be considered potentially significant.

Potential indirect impacts due to altered hydrology (Impact BB-5) or weed invasion (Impact BB-6) would be potentially significant, similar to the effects discussed for Phase 1. Potential direct and indirect impacts to upland vegetation, and/or wetlands due to overland travel during pipeline monitoring or pipeline repair (Impact B-3) could occur as well. Mitigation Measure B-3a would reduce these impacts to less than significant.

Implementation of the mitigation measures similar to those described in Sections D.4.3.3 would likely be able to reduce all construction impacts to less than significant levels.

Wildlife and Aquatic Species — Carquinez Strait Crossing

Phase 1. Wildlife habitat would be temporarily disturbed during pipeline, access road and staging area construction, thereby reducing the amount of habitat available to local wildlife populations in this segment. Special status wildlife species potentially impacted by construction-related activities within Segment 1 include: California linderella, California red-legged frog, California black and clapper rail, salt marsh harvest mouse and Suisun ornate shrew. Wildlife Mitigation Measures BW-1a through BW-3d provide specific recommendations for reducing potential adverse impacts to special status wildlife species and their habitat(s) to less than significant levels.

Phase 2. Assuming that stringing techniques for directional drilling will be similar to those in use today, the proposed Phase 2 would likely result in much greater impacts to wildlife habitat and associated special status species than Phase 1. Large expanses of tidal and freshwater wetland habitats occur in the immediate vicinity of the proposed bore location. These wetlands would likely be directly impacted by construction activities that would require large adjacent areas for pipeline stringing. The surrounding marshes support a variety of special status wildlife species that could be directly and indirectly impacted, such as those described for Segment 1 in Phase 1 of the project. In addition, restoration activities planned for Peyton Slough will increase the amount and improve the quality of sensitive habitat in the vicinity of the bore and string locations, increasing the likelihood of impacts to special status species that may colonize this area. Detailed habitat studies and special status species surveys will need to be conducted prior to any construction-related activities in order to determine the full extent of potential adverse impacts to wildlife from this phase of the project, and to develop mitigation appropriate at the time of construction.

Marine Biology

SFPP has proposed HDD crossings for Walnut Creek, Grayson Creek, and Peyton Slough. Therefore, the only potential for direct construction impacts to marine resources in the segment south of the Carquinez Strait would be from open cut trenching of the pipeline at the Pacheco Creek crossing, which is tidal at the point of crossing. Pipeline construction would disrupt aquatic habitat temporarily and would interfere with fish movement temporarily. Localized temporary disruption of aquatic habitat in Pacheco Creek is considered an adverse but less than significant impact (Class III). Similarly, temporary disruption of fish movement is considered adverse but less than significant, because of the lack of quality upstream fish habitat (Class III). However, disturbance of sediment during construction could result in turbidity and degradation of tidal habitat downstream. Degradation of downstream habitat, even temporarily, could affect use of the area by sensitive fish species including the Sacramento splittail, and, potentially, Chinook salmon and steelhead. Anadromous fish including the listed salmonids may enter Pacheco Creek to access the Walnut Creek watershed. Degradation of downstream tidal habitat in Pacheco Creek is considered a potentially significant impact that would be mitigable to less than significant levels (Class II) through implementation of Mitigation Measure HS-1d (see Section D.8). In addition, mitigation is required to reduce erosion and sedimentation (Mitigation Measure HS-1c) and to protect water quality during construction (compliance with NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan).

With the exception of a potential unanticipated release of drilling muds, Grayson Creek, Walnut Creek, and Peyton Slough will not be disturbed directly by the proposed pipeline construction because the crossings of these waterbodies would be by HDD. However, work adjacent to waterbodies has the potential to degrade the waterbodies by the introduction of sediment from erosion or by spills of fuel or other hazardous materials into the stream. Sensitive fish species that may be in these waterbodies include Chinook salmon, Sacramento splittail, and steelhead. Degradation of waterbodies used by listed fish species is a potentially significant adverse impact that could be mitigated to less than significant levels by the compliance with NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan and other water quality protection measures in Section D.8.

The potential also exists to degrade the aquatic habitat between MP 0.0 and MP 5.0 through the discharge of hydrostatic test water into those streams. Hydrostatic test water could introduce contaminants such as metals into these streams. Because Peyton Slough, Pacheco Creek, Grayson Creek, and Walnut Creek may be used by listed fishes including Sacramento splittail, Chinook salmon, and steelhead, any degradation of the habitat of these species would be considered a potentially significant impact (Class II). Habitat degradation from the introduction of toxic substances in hydrostatic test water would be mitigated to less than significant levels through implementation of Mitigation Measure HS-2a.

Phase 1 Carquinez Strait Crossing. Because Phase 1 requires that the proposed new pipeline would connect to the existing pipeline to cross Carquinez Strait, Phase 1 pipeline construction would have no direct impact to the aquatic resources of Carquinez Strait. Construction activities near Carquinez Strait or adjacent to waterbodies such as Peyton Slough that drain into Carquinez Strait have the potential to degrade the habitat for aquatic resources in Carquinez Strait through the introduction of fuels or other toxic substances or the runoff of sediments. Because Carquinez Strait is used by many sensitive fish species including Chinook salmon, Central Valley steelhead, Delta smelt, Sacramento splittail, longfin smelt, and green sturgeon, any degradation of aquatic habitat in Carquinez Strait would be a potentially significant impact (Class II). The impact could be mitigated to less than significant levels by the implementation of mitigation measures to protect surface and following quality presented in Section D.8.

The potential also exists to degrade the aquatic habitat of Carquinez Strait through the discharge of hydrostatic test water into the Bay. Hydrostatic test water could introduce contaminants such as metals into the waters of Carquinez Strait. Because Carquinez Strait is used by several listed fish species, any degradation of the habitat of these species would be considered a significant adverse impact (Class II). Habitat degradation from the introduction of toxic substances in hydrostatic test water would be mitigated to less than significant levels through implementation of Mitigation Measure HS-3a.

Phase 2 Carquinez Strait Crossing. During Phase 2, a new segment of pipeline would be installed at the Carquinez Strait crossing by horizontal directional drilling under Carquinez Strait. No direct impacts would occur to Carquinez Strait from the proposed Phase 2 construction because the drilling would be deep beneath the floor of the Strait. However, as described for Phase 1 construction, construction activities near Carquinez Strait have the potential to degrade aquatic habitat in Carquinez Strait through the erosion of sediment into the Strait or the introduction of toxic materials. Because Carquinez Strait is used by many sensitive fish species including Chinook salmon, Central Valley steelhead, Delta smelt, Sacramento splittail, longfin smelt, and green sturgeon, any degradation of aquatic habitat in Carquinez Strait could cause a significant impact that would require protective measures similar to those defined for Phase 1 above.

As was true for Phase 1 construction, the potential also exists to degrade the aquatic habitat of Carquinez Strait through the discharge of hydrostatic test water into the Bay. Hydrostatic test water could introduce contaminants such as metals into the waters of Carquinez Strait. Because Carquinez Strait is used by several listed fish species, any degradation of the habitat of these species would be considered a significant impact that could be reduced through implementation of protective measures similar to Mitigation Measure HS-2a.

Finally, the HDD under Carquinez Strait could result in the accidental release of drilling muds into the water column. The release of muds would increase turbidity in the water and might cause fishes to avoid the affected area. A small localized increase in turbidity would not be a significant impact but if the drilling mud release spread over a large area, it might cause sensitive fish species to avoid a substantial portion of their habitat or harm sensitive life stages such as salmon smolt. Degradation of the habitat of listed fishes or harm to sensitive life stages would be a significant impact that could be mitigated to less

than significant levels by the implementation of protective measures similar to Mitigation Measure HS-3a.

Segment 2 (MP 6.1–17.6) – Benicia and I-680 Frontage

Vegetation and Wetlands

Construction impacts in Segment 2 would be similar to those of Segment 1, described above and in Section D.4.3.3. Implementation of the mitigation measures described in Sections D.4.3.3 would reduce all construction impacts to less than significant levels.

Impacts to upland vegetation types, such as oak woodland, annual grassland, and cultivated field (Impact BB-3), or to wetlands (freshwater seep, brackish marsh, freshwater marsh, seasonal alkali marsh, riparian forest, and riparian scrub) (Impact BB-5) may occur due to vegetation removal within the 100-foot-wide project ROW, due to trenching along the pipeline route and from pit excavation (associated with the three bore stream crossings), resulting in a temporary loss of vegetation. Appendix 1D shows that approximately 1.6 acres of jurisdictional wetlands would be affected along this segment (Impact BB-5; Mitigation Measure BB-5a, BB-5b, and BB-5c). This temporary impact to annual grasslands, and cultivated field areas would be considered adverse, but not significant (Class III). Impacts to oak woodland, riparian forest (Impact BB-3), and wetlands (Impact BB-5) due to vegetation removal are considered potentially significant (Class II) and would require Mitigation Measures BB-3a, BB-5a, BB-5b, and BB-5c to reduce potential impacts to less than significant.

Wildlife and Aquatic Species

Wildlife habitat would be temporarily disturbed during pipeline installation and construction of access roads and staging areas, thereby reducing the amount of habitat available to local wildlife populations in this segment. Special status wildlife species potentially adversely impacted by construction-related activities within Segment 2 include: California red-legged frog, western pond turtle, California black rail, California clapper rail, Suisun song sparrow, salt marsh harvest mouse, and Suisun ornate shrew. Descriptions of each special status species that potentially occurs in this segment are presented in Appendix 1A. Wildlife Mitigation Measures BW-1a through BW-3d provide specific recommendations to reduce potential adverse impacts from construction to special status wildlife and aquatic species and their habitat(s) to less than significant levels.

Segment 3 (MP 17.6–24.5) – Cordelia

Vegetation and Wetlands

Similar to Segment 1, construction impacts on sensitive plant species and wetland areas (Impact BB-1) within this segment are considered potentially significant but mitigable (Class II) with implementation of Mitigation Measure BB-2a. Indirect impacts to two special status wetland plant species, Suisun marsh aster (east of ROW at MP 16.6, at MP 19.1–19.3, at MP 23.1–23.3, and adjacent to ROW at MP 23.8) and Contra Costa goldfields (north of ROW at MP 19.7–19.8 and south of ROW at MP 22.9–23.2), are possible where construction (including HDD work areas and pipeline trenching) may impinge upon habitat due to erosion/sedimentation or deposition of hazardous substances (e.g., diesel fuel). Construction-related disturbance can provide an opportunity and seedbed for the spread and invasion of weeds (Impact BB-6). Such impacts may occur to Suisun marsh aster and to Contra Costa goldfields and would be considered potentially significant (Class II), but mitigable to less than significant with the implementation of Mitigation Measure BB-6a.

The loss of individuals or known habitats of rare, threatened, or endangered plant species would be considered a significant impact (Impact BB-2). Such impacts are possible where construction and related activities may remove Suisun marsh aster at occurrences within the ROW at MP 19.1–19.3 and MP 23.1–23.3. Construction activities resulting in the removal of a special status plant species would be considered potentially significant (Class II) with the implementation of Mitigation Measure BB-2a.

Impacts to upland vegetation types, such as annual grassland, cultivated field, oak woodland and riparian forest, or to wetlands (seasonal alkali marsh) may occur due to vegetation removal within the 100-foot-wide project right-of-way (ROW) and the four work areas associated with the two HDDs under Cordelia Slough and Ledgewood Creek. Trenching along the pipeline route and from pit excavation (associated with the four bore stream crossings) would also result in a temporary loss of vegetation. This temporary impact to annual grasslands and cultivated field would be considered adverse, but not significant (Class III). Impacts to oak woodland (Impact BB-3), and riparian forest (Impact BB-5) or to the approximately 10.9 acres of jurisdictional wetlands within this segment due to vegetation removal (Impact BB-5) may be considered potentially significant (Class II). Implementation of Mitigation Measures BB-3a, BB-5a, and BB-5c would reduce these construction impacts to less than significant.

Impact B-4: Construction Impacts and Potential Accidents in Cordelia Marsh

Construction disturbance to vegetation and wetlands and wildlife resources within Cordelia Marsh and Slough would be potentially significant. In addition, there is also the potential for a pipeline accident (Impacts B-1 and B-2) to occur in this area, resulting in significant unmitigable impacts in wetland areas. (Significant, Class I or Potentially Significant, Class II)

Impact Discussion

The Cordelia Marsh and Slough have areas of annual grasslands, brackish marsh, riparian scrub, and vernal pools. Many sensitive plant and animal species inhabit each of these habitat types. The area is specifically designated as special status species habitat for the Suisun shrew, the California clapper rail and black rail, and the salt marsh harvest mouse. Just west of Suisun Creek (MP 20.2-20.5), there are occurrences of blue and federally threatened valley elderberry, host plants for the valley elderberry longhorn beetle, which will be avoided by rerouting the pipeline 150 feet from the shrubs. Impacts identified for Segment 3 described above under the Proposed Project that are associated with construction disturbance to vegetation and wetlands and wildlife resources within Cordelia Marsh and Slough would be potentially significant (Class II). In addition to construction and operational impacts through approximately 2.4 miles of sensitive marsh habitat, there is also the potential for a pipeline accident (Impacts B-1 and B-2) to occur in this area, resulting in significant unmitigable impacts in wetland areas (Class I).

Section D.2 (Pipeline Safety and Risk of Accidents) includes analysis of impacts of an unintentional release northeast of Cordelia Creek (Scenario #2), near the proposed Cordelia Creek crossing in a valley, between two hills, at MP 19.4. Under the Proposed Project, remotely operated block valves are proposed to be located at MP 6.246 and MP 24.75. One manual block valve is located between the two remotely operated valves at MP 15.15. Since the manual valve is in a rural location, it was assumed in the scenario that it would take two hours to access and close this valve. It was also assumed that it would take an additional two hours (four hours total from leak detection) for emergency response equipment to arrive on site. There is also one check valve at MP 20.1.

As a result, Mitigation Measure S-2f (see Section D.2) proposes to relocate the check valve to a point upstream of the 80-foot hill, where it would be more useful. This mitigation measure would also reduce the maximum potential release volume at this location by 10%. Once the block valves are closed, the total

potential drain down volume to the release site is 4,295 barrels. At a release flow rate of 8,400 BPH, which is reasonable considering the local hydraulics, the entire drain down volume would be lost in approximately one-half hour. Since it was assumed that closing the manual valve would take up to two hours, the manual valve at MP 15.15 would not be effective in reducing the release volume in the event of a pipe rupture. After the manual valve has been closed, the potential drain down volume would be reduced to 1,863 barrels. At a release rate of 100 BPH, it would take approximately 18 hours to release the entire drain down volume.

However, even with implementation of Mitigation Measure S-2f, the impact of a pipeline accident remains significant (Class I). Therefore, in order to avoid construction, operation, and a potential accident in the sensitive biological and water resources within Cordelia Marsh and Slough, a revised pipeline route through this area is recommended as Mitigation Measure B-4a below. A discussion of the impacts of this mitigation segment is included under each issue area in Section D.

Mitigation Measure for Construction Impacts and Potential Accidents in Cordelia Marsh

B-4a Cordelia Mitigation Segment. In order to minimize impacts to the sensitive biological and water resources of the Cordelia Slough and Marsh, a mitigation segment is recommended. The 2.6-mile segment diverges from the proposed route at MP 17.6 and rejoins the proposed route at approximately MP 20.0. The Cordelia Mitigation Segment parallels Ramsey Road, until Cordelia Road, where it continues along Cordelia Road to the UPRR ROW where it rejoins the proposed route. This segment is illustrated in Figure D.4-3.

Residual Impact. Implementation of the mitigation measures described in Sections D.4.3.3, along with Mitigation Measure B-4a above would reduce construction impacts to less than significant levels. Implementation of Mitigation Measures B-1a and B-3a would result in additional protection for sensitive slough and marsh resources because construction and operation would be near Cordelia Road where a spill could more easily be contained. Impacts from a medium or large spill could still flow into the Cordelia Slough if the accident occurred near the two waterway crossings in this segment. Therefore, while potential impacts would be reduced, there is still the possibility that a major spill could affect these sensitive resources (Class I).

Wildlife and Aquatic Species

Wildlife habitat would be temporarily disturbed during pipeline installation and construction of access roads and staging areas in Segment 3, thereby reducing the amount of habitat available to local wildlife populations in this segment. Special status wildlife species potentially impacted by construction-related activities within Segment 3 are defined in Table D.4-7 and include: California black rail, California clapper rail, tricolored blackbird, salt marsh harvest mouse, and Suisun ornate shrew. Wildlife Mitigation Measures BW-1a through BW-3d, as well as Mitigation Measure B-4a (above) provide specific proposed actions to reduce potential impacts to special status wildlife species and their habitat(s) to less than significant levels.

Segment 4 (MP 24.5–30.7) – Fairfield/Suisun City

Vegetation and Wetlands

Construction impacts on biological resources would be similar to Segment 1 and are considered potentially significant (Class II). Implementation of the mitigation measures described in Sections D.4.3.3 and D.4.3.4 would reduce these construction-related impacts to less than significant levels.

Figure D.4-3. Cordelia Mitigation Segment

In addition, indirect impacts to one special status plant species, Contra Costa goldfields (occurring adjacent to Walters Road east of the ROW at MP 28.1–28.7 and adjacent to Peabody Road east of the ROW at MP 29.8–29.9), is possible where construction and related activities (from pipeline trenching) would impinge upon habitat due to erosion/sedimentation or deposition of hazardous substances (i.e., diesel fuel) or facilitate the invasion of weeds. Mitigation Measures BB-2a and BB-6a would be required to reduce these impacts to less than significant. There are also approximately 0.8 acres of jurisdictional wetlands within this segment that would be impacted (see Appendix 1D) and would require implementation of Mitigation Measure BB-5a to reduce wetland impacts to less than significant.

Botanical surveys of the project area conducted by URS were not appropriately timed with the blooming period of one special status plant species, fragrant fritillary, which has the potential to occur along this segment. Although the cited blooming period for these species is February through April, the optimum bloom period is in mid-March. However, the earliest botanical survey conducted by URS was in early April, which was probably not early enough to determine the presence or absence of these species within the project area. Construction and related activities causing direct impact to these species or its habitat (Impact BB-2) would be considered potentially significant (Class II). The loss of individuals or known habitats of rare, threatened, or endangered plant species would be considered a significant impact. Such impacts are possible where construction and related activities may remove Contra Costa goldfields at occurrences within the ROW. Construction activities resulting in the removal of a special status plant species would be considered potentially significant (Class II), but mitigable with the implementation of Mitigation Measure BB-2a.

Impacts to upland vegetation types such as annual grassland, and ruderal area occur due to vegetation removal within the 100-foot-wide project ROW, due to trenching along the pipeline route and from pit excavation (associated with the three bore stream crossings), resulting in a temporary loss of vegetation. This temporary impact to annual grasslands and ruderal area (Impact BB-3) would be considered adverse, but not significant (Class III).

Wildlife and Aquatic Species

Wildlife habitat would be temporarily disturbed during pipeline installation and construction of access roads and staging areas in Segment 4. Special status wildlife species occurring within Segment 4, and so could potentially be adversely impacted by construction-related activities are listed in Table D.4-7 and include: vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, California linderiella, and western burrowing owl. SFPP's reroutes, which have been incorporated into the Proposed Project to avoid sensitive species and habitats, as well as Wildlife Mitigation Measures BW-1a through BW-3d, which provide specific proposed actions to reduce potential adverse impacts to special status wildlife species and their habitat(s), would reduce potential impacts to less than significant levels.

Segment 5 (MP 30.7–65.1) – Solano and Yolo Counties Agricultural Area

Vegetation and Wetlands

Implementation of the Mitigation Measures BB-2a through BB-6a and BW-1a through BW-3d, as well as appropriate Hydrology and Water Quality Mitigation Measures HS-1a, HS-1b, HS-1c, HS-1d, and HS-3a would reduce construction impacts (similar to Segment 1) to less than significant levels. Indirect impacts to one special status wetland plant species, hogwallow starfish (at an occurrence ten feet east of the ROW at MP 53.5–53.7), are possible where construction and related activities (from bore pit excavation and pipeline trenching) would impinge upon habitat due to erosion/sedimentation or deposition of hazardous substances (i.e., diesel fuel) or facilitate weed invasion. As described in Impact BB-1, construction impacts on these sensitive plant species and on wetlands within this segment are considered potentially

significant (Class II). Based on jurisdictional wetlands delineations, this segment has 43.9 acres of jurisdictional wetlands that would be affected by the proposed pipeline (see Appendix 1C, 1D, and 1E); Mitigation Measure BB-5a would reduce impacts to wetlands to less than significant levels.

Similar to Segment 1 and discussed in Impact BB-2, botanical surveys of the project area conducted by URS were not appropriately timed with the blooming period of two special status plant species, fragrant fritillary and adobe lily, which have the potential to occur along this segment. Although the cited blooming period for these species is February through April, the optimum bloom period is in mid-March. However, the earliest botanical survey conducted by URS was in early April, which was probably not early enough to determine the presence or absence of these species within the project area. Construction and related activities causing direct impact to these species or its habitat would be considered potentially significant (Class II), mitigable with Mitigation Measure BB-2a.

The loss of individuals or known habitats of rare, threatened, or endangered plant species would be considered a significant impact (Impact BB-2). Such impacts are possible where construction and related activities may remove or impact the buffer zone for hogwallow starfish. Construction activities resulting in the removal of a special status plant species would be considered potentially significant (Class II).

Impacts to upland vegetation types, such as annual grassland, cultivated field, oak woodland (possibly eucalyptus), riparian forest, and ruderal area (UBB-5V-1) and to wetlands (freshwater marsh, seasonal marsh, brackish marsh, riparian scrub and vernal pool) (Impact BB-5) may occur due to vegetation removal within the 100-foot-wide project ROW, within the work areas and pipeline laydown area (associated with the West Yolo Bypass crossing) associated with the five HDD crossings, due to trenching along the pipeline route and from pit excavation (associated with the 24 bore stream crossings). This temporary impact (Impact BB-3) to annual grasslands, cultivated field, and ruderal area would be considered adverse, but not significant (Class III). Impacts to oak woodland, riparian forest, and wetland areas are considered potentially significant (Class II).

Pipeline construction would temporarily disrupt the hydrology of the wetlands within and adjacent to pipeline construction that may persist due to improper backfill and soil compaction of the pipeline trench (Impact BB-5). Impacts to wetlands that are habitat for special status plant species would cause an impact to the species occupying those habitats. Construction-related disturbance of habitats will provide an opportunity and seedbed for the spread and invasion of weeds (Impact BB-6). The introduction or expansion of exotic species or hydrology alternation may cause an impact to hogwallow starfish mentioned above. Impacts to special status plants, upland vegetation, and wetlands from hydrology alteration and/or weed invasion would be considered potentially significant (Class II).

Wildlife and Aquatic Species

Wildlife habitat would be temporarily disturbed during pipeline installation and construction of access roads and staging areas, thereby reducing the amount of habitat available to local wildlife populations in this segment. Special status wildlife species potentially adversely impacted by construction-related activities within Segment 5 include: vernal pool fairy shrimp, vernal pool tadpole shrimp, mid-valley fairy shrimp, California linderiella, giant garter snake, Swainson's hawk, and western burrowing owl. Surveys by URS in 2002 observed burrowing owls at MP 31.3, MP 32.7, and MP 54.8–55.6. SFPP's reroutes, which have been incorporated into the Proposed Project to avoid sensitive species and habitats, as well as wildlife Mitigation Measures BW-1a through BW-3d provide specific proposed actions to reduce potential adverse impacts to special status wildlife species and their habitat(s) to less than significant levels.

Segment 6 (MP 65.1–69.9) – West Sacramento

Vegetation and Wetlands

Impacts to upland vegetation types such as annual grassland would occur due to vegetation removal within the 100-foot-wide project ROW, work areas associated with the HDD under the East Yolo Bypass and Washington Lake, the pipeline laydown areas associated with the East Yolo Bypass HDD crossing, and due to trenching along the pipeline route, resulting in a temporary loss of vegetation. This temporary impact (Impact BB-3) to annual grasslands areas would be considered adverse, but not significant (Class III). Impacts to the affected 0.4 acres (see Appendix 1) of jurisdictional wetlands along this segment (Impact BB-5) would be considered potentially significant (Class II).

Wildlife and Aquatic Species

Wildlife habitat would be temporarily disturbed during pipeline installation and construction of access roads and staging areas, thereby reducing the amount of habitat available to local wildlife populations in this segment. Special status wildlife species potentially adversely impacted by construction-related activities within Segment 6 include: vernal pool fairy shrimp, California linderiella, Swainson's hawk, and western burrowing owl. Wildlife Mitigation Measures BW-1a through BW-3d provide specific proposed actions to reduce potential adverse impacts to special status wildlife species and their habitat(s) to less than significant levels.

Segment 7 – Wickland Connection

Vegetation and Wetlands

No impacts to special status plant species are anticipated during pipeline construction along the Wickland Connection. Also, the jurisdictional delineation performed by URS did not find any wetlands impacted along this segment. Regardless, potential indirect impact due to erosion, sedimentation and/or contamination would be considered potentially significant within the segment (Class II). Impacts to upland vegetation types such as annual grassland would occur due to vegetation removal within the 100-foot-wide project ROW and due to trenching along the pipeline route, resulting in a temporary loss of vegetation (Impact BB-3). This temporary impact to annual grasslands and wetlands would be considered adverse, but not significant (Class III). Similar to the discussion in Segment 1 and Section 4.3.3, impacts due to weed invasion (Impact BB-6) would be considered potentially significant within this segment (Class II). Potential direct and indirect impacts to upland vegetation due to overland travel during pipeline monitoring or pipeline repair (Impact B-3) could occur (Class II). Implementation of the mitigation measures described in Sections D.4.3 through D.4.5 would reduce these impacts to less than significant levels.

Wildlife and Aquatic Species

Wildlife habitat could be temporarily disturbed during pipeline installation and construction of access roads and staging areas, but no special status wildlife species would be impacted by construction-related activities within Segment 7.

D.4.3.7 Impacts of Proposed Station Changes and Valves

Proposed station changes would occur entirely within the existing Concord and Sacramento Stations, so there will be no impacts to biological resources. As discussed for Impact BB-4, construction of valves would result in permanent loss of vegetation along the pipeline route. However, because the area permanently impacted by proposed valves would be small and would be located in areas away from sensitive plant

species, this impact is also considered adverse, but less than significant and no mitigation is required (Class III).

D.4.3.8 Cumulative Impacts

Vegetation and Wetlands

Potentially significant impacts to sensitive vegetation may result from residential, commercial, industrial development, and contaminant remediation projects (e.g., Peyton Slough) in the region. Impacts of these projects may include vegetation removal, altered hydrology, erosion/sedimentation, and spread of weeds. Mitigation through avoidance, minimization, and on and off-site compensatory habitat (as defined in Sections D.4.3.3 through D.4.3.5 above) should reduce impacts to a less than significant level. The Proposed Project would avoid impacts to most special status plant species. Impacts to sensitive vegetation along the proposed pipeline would be temporary and mitigated by on-site restoration of the impact site. Since these types of mitigation have a high success rate, long-term impacts would be expected to result in no significant cumulative impacts.

There are no known plans for construction of additional petroleum product pipelines in the proposed pipeline corridor. The Wickland connection portion of the project, however, would join a proposed pipeline and tank farm project that would ultimately connect the project to the Sacramento Airport (Sacramento International Airport Jet Fuel Pipeline and Tank Farm Project). The EIR for this project identified temporary impacts to wetlands and potential impacts to the Sacramento River and its associated vegetation communities. In addition, Caltrans is currently installing a new I-680 span of the Benicia-Martinez Bridge adjacent to the proposed pipeline project and within the Carquinez Strait. Potential project-related biological impacts from this project are primarily associated with the construction and placement of the bridge footing in Carquinez Strait which may affect special status aquatic fauna, but could impact special status plants that occur in the vicinity such as Mason's lileopsis. Similarly, the proposed Peyton Slough Remediation project is adjacent to and within the Proposed Project ROW, and would realign the existing slough resulting in temporary impacts to tidal wetlands and potential impacts to special status wetland plant species such as Mason's lileopsis. Potentially significant impacts to special status plant species and sensitive vegetation types may result from two sewer pipeline projects planned in a developed portion of the City of West Sacramento. These projects may result in spills that would affect sensitive resources. Spills from the sewer pipelines, however, would not result in severe long-term impacts to vegetation resources, which could occur as a result of spills from the proposed petroleum product pipeline operation. Therefore, although operation of the petroleum pipeline is likely to result in a significant and unmitigable impact, it would not be cumulative, relative to future planned projects.

Wildlife and Aquatic Species

Cumulative effects to wildlife are those that result from the incremental impacts of an action added to other past, present, and reasonably foreseeable future actions, regardless of who is responsible for such actions. Cumulative effects to wildlife can result from individually minor but collectively significant actions taking place over a period of time. Future project activities that would potentially affect wildlife species in the Proposed Project include, but are not limited to, development associated with urban, water, flood control, highway/roadway and utility installation and improvement; application of herbicides/insecticides (i.e., chemical contaminants); remediation projects, and conversion of sensitive habitats (e.g., wetlands and riparian areas) to other land uses.

As described above for vegetation and wetlands, the Wickland connection will join to a newly proposed pipeline that would temporarily impact wetlands. Additional potential impacts from this project may include those to giant garter snake, special status raptors, and aquatic species that occur within the

Sacramento River. Potential project-related wildlife impacts from the Cal Trans Benicia-Martinez Bridge project would primarily be associated with the construction and placement of the bridge footing in Carquinez Strait which may affect special status aquatic species that occur in the vicinity (e.g. steelhead, salmon, Delta smelt, Sacramento splittail, and green sturgeon). Similarly, the realignment of Peyton Slough would result in impact to tidal wetlands and the special status wildlife species that occur in these areas (e.g., salt marsh harvest mouse, and black rail).

The Proposed Project and other projects identified as occurring in the vicinity would primarily result in temporary impacts to vegetation and wildlife habitat. The temporary removal of wildlife habitat within the project ROW, and at other projects that permanently and temporarily remove wildlife habitat in the vicinity, creates a cumulative effect on wildlife habitat. However, the temporary loss of wildlife habitat would not result in a significant cumulative impact to wildlife with the implementation of mitigation measures designed to minimize effects to wildlife species and to restore affected wildlife habitats to pre-existing conditions.

Marine Biology

The only identified project on the cumulative project list that would affect marine resources is the ongoing construction of the Benicia-Martinez Bridge. Construction of this bridge would disturb aquatic organisms in Carquinez Strait by in-water construction especially by the noise and vibration impacts of pile driving. The proposed pipeline project would not contribute to the cumulative disturbance of marine resources in Carquinez Strait because no construction within the Strait is proposed. The new pipeline would connect to the existing pipeline to cross Carquinez Strait. Pipeline construction near Carquinez Strait and crossing of tidal waterbodies that are contiguous with Carquinez Strait or Suisun Bay could introduce sediments or pollutants to bay waters. The introduction of project-related pollutants to the Bay would act cumulatively with substances that may enter the Bay during Benicia-Martinez Bridge construction. These potentially significant impacts could be reduced to insignificant levels by adhering to standard Best Management Practices during construction.

In the unlikely event that a project-related product spill occurred during bridge construction and entered the water of Carquinez Strait, the product would add to the stresses of marine organisms that already may be stressed by bridge construction. The cumulative impacts of smaller spill may be mitigable to insignificant levels by rapid response, containment, and cleanup. However, in the event of a large spill, impacts may remain significant.

D.4.4 Environmental Impacts and Mitigation Measures for Existing Pipeline ROW Alternative

D.4.4.1 Vegetation and Wetlands

Wetlands

Potential impacts to wetlands, including brackish marsh, salt marsh, seasonal alkali marsh, and riparian scrub, in the existing pipeline alternative would be similar to those in the proposed pipeline project. The existing pipeline project has the potential to affect approximately 6.4 additional miles of wetlands as compared to the proposed pipeline project. In addition, the Existing Pipeline ROW Alternative route has the potential to impact as much as 15 miles of vernal pools, which is much more than the 0.75 miles of vernal pools along the proposed pipeline. These wetland impacts would be similar in type to those for the proposed pipeline project. Impacts to wetlands due to construction and maintenance would be considered significant, but mitigable (Class II). Implementation of Mitigation Measures HS-1c, compliance with

NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan, and Mitigation Measures BB-3a, BB-5a, BB-5b, and B-5c (Sections D.4.3.3 and D.4.3.4), would reduce these impacts to wetlands to less than significant levels.

Impacts from small spills and associated cleanup activities to wetlands may be considered significant, but mitigable (Class II) if the affected wetland types can be identified and restored or recreated off-site. However, large spills and subsequent cleanup activities may be significant and unmitigable (Class I) if the wetland types within the spill extent cannot be determined and/or restoration or creation of wetlands is infeasible or unsuccessful. Implementation of Mitigation Measure B-1a (pipeline spill mitigation) may not reduce spill impacts to wetlands to less than significant levels.

Impact B-5: Construction and Potential Accidents in Suisun Marsh

Mitigation Segment EP-1

Because this alternative route has the potential to create serious construction and accident impacts to extensive areas of wetlands in and around the Suisun Marsh, a mitigation segment is recommended to avoid most sensitive resources. Mitigation Segment EP-1 (Mitigation Measure B-5a) was developed to avoid the sensitive habitat in the slough and marshland described above and as Impact B-5 (Potential direct impact to wetlands due to vegetation removal). The California Department of Fish and Game (CDFG) has designated the Suisun Marsh as a Significant Natural Area due to the number of rare species it supports. There are also potential land use concerns associated with the CDFG permitting through the Grizzly Island Wildlife Area. At approximately 12 miles long, the mitigation segment would be more than four miles longer than the Existing Pipeline ROW Alternative, but would avoid the Suisun Marsh and Grizzly Island Wildlife Area. By reducing impacts to approximately 7.2 miles of wetlands, Mitigation Segment EP-1 would reduce potential impacts to special status plant species as compared to the original Existing Pipeline ROW Alternative. Impacts to special status plant species due to construction, accidents and maintenance of the Existing Pipeline ROW Alternative with Mitigation Segment EP-1 would be similar to those for Proposed Pipeline Project. A discussion of impacts for Mitigation Segment EP-1 is included under each issue area in Section D.

Mitigation Measure for Impact B-5: Construction and Potential Accidents in Suisun Marsh

B-5a Mitigation Segment EP-1. As illustrated on Figure D.4-4, this mitigation segment would diverge from the Existing Pipeline ROW Alternative route near Pierce Lane along Goodyear Road. Where the Existing Pipeline ROW Alternative would follow the UPRR ROW and bear northeast across the Suisun Marsh and Slough, which is the largest managed marsh in the San Francisco estuary, as well as the Grizzly Island Wildlife Area, this mitigation segment would follow the route of the Proposed Project, continuing north paralleling access roads along I-680 until just north of Smith Drive on Ramsey Road. At this point, it would turn northeasterly and follow an existing transmission corridor and dirt roads through the Cordelia Marsh and across the Cordelia Slough. On the east side of the slough, the proposed route would briefly enter the City of Fairfield and would parallel the UPRR right-of-way until it would intersect with and turn east adjacent to Cordelia Road. The mitigation segment would return to unincorporated Solano County along Cordelia Road. Approximately 800 feet east of Pennsylvania Ave, the pipeline would cross the UPRR tracks where it would rejoin the Existing Pipeline ROW Alternative route.

Figure D.4-4. Mitigation Segment EP-1

Residual Impact. The implementation of Mitigation Measures HS-1c, compliance with NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan, and Mitigation Measures BB-2a (Rare Plant Avoidance), BB-6a (Weed Management), BB-5a (Wetland Avoidance and Restoration), BB-5b (Trench Backfill and Topographic Restoration), and B-3a (Operation and Maintenance Mitigation) as described in Sections D.4.3.4 and D.4.3.6, as well as Mitigation Measure B-5a described above, would reduce these impacts to special status plant species to less than significant levels. Depending on the size of the spill, Mitigation Measure B-1a (Pipeline spill mitigation) may not reduce spill impacts to special status plant species to less than significant levels.

Mitigation Segment EP-2

Mitigation Segment EP-2 is a route that would avoid central Davis to minimize land use impacts. Use of this segment is not likely to increase or reduce impacts to wetlands as compared to the original alternative route.

Special Status Plant Species

The Existing Pipeline ROW Alternative and the proposed pipeline pass through similar special status species habitat types. The same 32 special status plant species have been documented to occur in the habitats traversed by the two pipeline routes. Based on surveys for special status plants conducted along the proposed pipeline route, four of the 32 species with potential to occur may be affected (see Appendix 1). No surveys have been conducted along existing pipeline alternative route. Many of the sensitive species with potential to occur along the two routes grow in wetland habitats. The existing pipeline alternative passes through approximately six more miles of wetlands than the proposed pipeline. Therefore, the existing pipeline ROW alternative has the potential to have a greater impact to special status plants than the proposed pipeline project. However, these impacts to special status plant species along the existing pipeline ROW alternative would be similar to those for the proposed pipeline project, pending surveys of the pipeline route. Compliance with NPDES requirements for preparation of a Stormwater Pollution Prevention Plan and a Hazardous Materials Management Plan, and the implementation of Mitigation Measures HS-1c, BB-2a (Rare Plant Avoidance), BB-6a (Weed Management), BB-5a (Wetland Avoidance and Restoration), BB-5b (Trench Backfill and Topographic Restoration) and B-3a (Operation and Maintenance Mitigation) as described in Sections D.4.3.4 and D.4.3.6, as well as Mitigation Measure B-5a described above, would reduce these impacts to special status plant species to less than significant levels.

Impacts from small spills and associated cleanup activities to special status plants may be considered significant, but mitigable (Class II) if the populations of rare species are known within the spill extent and can be feasibly restored or reestablished. However, as for the Proposed Project, large spills and subsequent cleanup activities to undocumented special status plants or those that may become established during the lifetime of the project would be considered significant and unmitigable (Class I). Impacts to special status plants from large spills may also be significant and unmitigable (Class I) if restoration or reestablishment of the known populations is infeasible or unsuccessful. Therefore, implementation of Mitigation Measure B-1a (pipeline spill mitigation) (Section D.4.3.5) may not reduce spill impacts to special status plant species to less than significant levels.

Mitigation Segment EP-1

By reducing impacts to approximately 7.2 miles of wetlands, Mitigation Segment EP-1 (recommended in Mitigation Measure B-5a) would reduce potentially significant impacts to special status plant species as compared to the original Existing Pipeline ROW Alternative. Implementation of this mitigation segment is strongly recommended to reduce impacts to the Suisun Marsh resources. Assuming implementation of

this segment, impacts to special status plant species due to construction, accidents and maintenance of the Existing Pipeline ROW Alternative would be similar to those for Proposed Pipeline Project.

Mitigation Segment EP-2

Mitigation Segment EP-2, recommended in Section D.9 (Land Use), is not likely to increase or reduce impacts to special status plant species as compared to the original existing alternative route.

Upland Vegetation Types

The total upland vegetation disturbance in the Existing Pipeline ROW Alternative would affect approximately 14 fewer miles than along the Proposed Project. The Existing Pipeline ROW Alternative would affect approximately 0.6 more miles of riparian forest. Impacts to oak woodland are not known because surveys along the alternative route have not been completed. In general, potential impacts would be similar in nature to those of the proposed route.

Potential impacts to sensitive upland vegetation types due to overland travel and removal during pipeline repair would be considered significant, but mitigable (Class II). Implementation of Mitigation Measure B-3a (Operation and Maintenance) (Section D.4.3.6) would reduce these impacts to less than significant levels.

Impacts from small spills and associated cleanup activities to upland vegetation types would be considered significant, but mitigable (Class II) as the affected vegetation types can be identified and restored or recreated off-site. Implementation of Mitigation Measure B-1a (Section D.4.3.5) would reduce spill impacts to sensitive upland vegetation types to less than significant levels.

Impacts to upland vegetation types including annual grassland, ruderal area, oak woodland, and riparian forest along the Existing Pipeline ROW Alternative may include (1) the loss of vegetation due to construction; (2) potential impacts due to pipeline accidents and subsequent cleanup; (3) impacts to upland vegetation types from maintenance of the existing pipeline alternative due to pipeline repair work and overland travel during periodic monitoring of the pipeline route. These impacts would be similar in type to those for the Proposed Project.

Potential impacts due to the loss of upland vegetation types include annual grassland, cultivated field, and ruderal area during construction. These impacts are considered adverse, but not significant (Class III).

Impact BB-7: Construction in Native Grasslands Causes Vegetation Removal

Construction in native grasslands could cause vegetation removal and impacts to CDFG sensitive vegetation types. (Potentially Significant, Class II)

Impact Discussion

Potential impacts due to the loss of sensitive upland vegetation types such as native grassland, oak woodland and riparian forest during construction and operations would be considered significant, but mitigable (Class II). The identification of native grasslands, identified as a sensitive vegetation type by CDFG, has not been performed along the Existing Pipeline ROW. The Existing Pipeline ROW passes through a 15-mile segment where inclusions of native grassland are known to occur, in the vicinity of Travis Air Force Base and Dixon. Due to the anticipated presence of this native grassland area and in the event that native grasslands are present along other sections of this alternative, impacts to CDFG sensitive vegetation types would be considered a potentially significant impact (Class II) if not avoided. The

implementation of Mitigation Measures BB-3a (Tree Avoidance and Replacement), BB-5c (Riparian Avoidance and Restoration), and BB-7a (Native Grassland Avoidance and Restoration, below) would reduce these impacts to less than significant levels. Potential impacts to upland vegetation types due to the opportunity for the introduction of exotic and invasive vegetation during construction would also be considered significant, but mitigable (Class II). The implementation of Mitigation Measures BB-6a (Weed Management) would reduce this impact to less than significant levels.

Mitigation Measure for Impact BB-7: Construction in Native Grasslands Causes Vegetation Removal

BB-7a Native Grassland Avoidance and Restoration. Since no native grassland was observed within the proposed pipeline ROW, this measure only applies to the Existing Pipeline ROW Alternative. SFPP shall avoid, minimize, and compensate for direct impacts to native grasslands, identified as sensitive communities by CDFG, due to pipeline construction activities by conducting:

- Surveys and mapping of all native grasslands defined as sensitive by CDFG.
- Maximum avoidance of sensitive communities by fencing.
- Restricted vegetation removal and topsoil storage and replacement.
- Consultation with the CDFG for any unavoidable sensitive community impacts.
- Supervision and verification of the implementation of these measures by the Environmental Monitor.

The initial step for this measure will be completion of surveys to identify and map native grasslands defined as sensitive by CDFG (grassland with greater than 20 percent cover of native grass species) within the pipeline right-of-way and associated work areas. These communities will be mapped and avoided to the maximum extent feasible.

If construction work areas and/or associated overland travel in native grasslands is unavoidable, the following measures will be implemented during construction to minimize long-term impacts: (1) the upper 12 inches of topsoil shall be salvaged, stored in an upland location, and replaced; (2) project construction plans shall depict appropriate measures for topsoil protection and storage that will allow for survival of the native seed bank within the topsoil; (3) topsoil shall be replace at the surface and not used to backfill the trench, and excavated trench spoils or excess fill shall be placed over the pipeline under the topsoil and not dispersed onto the surface of the ROW. Implementation of these measures prior to and during construction will be supervised and verified by the Environmental Monitor (see Mitigation Measure BW-2b).

Unavoidable direct impacts to native grasslands during construction and/or associated overland travel shall be mitigated by restoration of the affected area to pre-construction conditions. Procedures shall include, at a minimum, the following:

- A map of affected native grassland communities to be impacted.
- Measures demonstrating how maximum avoidance has been accomplished and why the proposed impact cannot be avoided.
- Methods proposed for restoring the community, regionally native seed and/or plant materials to be used such that pre-construction species composition is restored, seed/plant installation methods, and maintenance measures (including weed control).

- A minimum five-year monitoring program with detailed success criteria regarding species cover (such that the pre-construction percent cover of native grass species is restored), species composition, and species diversity as compared with pre-construction conditions documented prior to construction by a qualified biologist (the methods and results of which shall be described in the Plan).
- Annual reporting to CDFG.
- Detailed contingency measures in case of restoration failure (as determined by the responsible agencies following the five-year monitoring period), requiring remediation of the restored area with additional seeding and/or planting.

Implementation of these measures shall be supervised and verified by the Environmental Monitor or other qualified biologist.

Residual Impact. Implementation of the mitigation measures mentioned above and Mitigation Measure BB-7a (Native Grassland Avoidance and Restoration) would reduce impacts to native grasslands to less than significant levels.

Mitigation Segment EP-1

Mitigation Segment EP-1 (Mitigation Measure B-5a) would increase the potential impacts to upland vegetation types by approximately 13 miles as compared to the original Existing Pipeline ROW Alternative route, which would primarily pass through wetlands. Impacts to riparian forest would be approximately equal to the original existing route. Impacts to oak woodlands are not known because surveys along the Existing Pipeline ROW Alternative route have not been completed.

Mitigation Segment EP-2

Mitigation Segment EP-2 would reduce impacts to developed areas by one mile as compared to the original Existing Pipeline ROW Alternative route, replaced primarily by cultivated field, annual grassland, and ruderal areas.

Summary: Existing Pipeline ROW Alternative

Although the Existing Pipeline ROW Alternative may impact more special status plant species habitat, wetlands, and riparian forest, the implementation of the mitigation measures would reduce construction and operations/maintenance impacts to less than significant levels and thus would be essentially equal to the proposed pipeline route. However, since the Existing Pipeline ROW Alternative passes through approximately seven more miles of sensitive vegetation types than the proposed pipeline, the Existing Pipeline ROW Alternative has the potential to have a greater extent of Class I impacts due to spills. Therefore, the proposed pipeline route is preferable to the Existing Pipeline ROW Alternative.

Mitigation Segment EP-1 is preferable to the original Existing Pipeline ROW Alternative route as it would reduce potential impacts to wetlands and potential habitat for special status plant species by approximately 7.2 miles. Mitigation Segment EP-2 is not necessarily preferable to the original existing pipeline route as it would not reduce or increase potential impacts to sensitive plants or vegetation types.

When the Existing Pipeline ROW Alternative route using the EP-1 mitigation segment is compared to the Proposed Project, the impacts to sensitive vegetation types are almost identical (approximately 6.6 miles and 6.8 miles, respectively). However, the Existing Pipeline ROW Alternative without EP-1 may impact more miles of highly valuable vegetation types, including approximately 0.5 more miles of salt marsh

wetland, 0.7 more miles of riparian forest, and 15 more miles of potential vernal pool area. The increased miles of salt marsh along the Existing Pipeline ROW Alternative without EP-1 would increase the potential of a spill to occur in a tidal area where it could be transported for larger distances.

D.4.4.2 Wildlife and Aquatic Species

Wildlife Habitats. In general, construction and operational impacts of the Existing Pipeline ROW Alternative on wildlife habitats would be similar to those discussed for the Proposed Project. The alternative route, however, crosses a much larger extent of sensitive wildlife habitat associated with sloughs and marshlands of Suisun Bay, including portions of the CDFG-managed Grizzly Island Wildlife Area. Consequently, the alternative route would result in much greater impacts to habitats and their associated wildlife, and ultimately result in greater overall project impacts.

The Existing Pipeline ROW Alternative with Mitigation Segment EP-1 would avoid the majority of marshlands of Suisun Bay and the Grizzly Island Wildlife Area. This route configuration would, therefore, result in less overall impacts to wildlife habitat than the Existing Pipeline ROW Alternative alone, and impacts similar to the Proposed Project Route.

Special Status Wildlife Species. Construction and operational impacts of the Alternative Route on special status wildlife species and their habitats would be similar to those discussed in the sections for habitat removal or disturbance of special status wildlife species in terms of the types of habitats and species impacted. Impacts, however, would be greatly increased in this Alternative due to the increased amount of sensitive tidal and freshwater marshland habitats crossed by the this route.

The Existing Pipeline ROW Alternative with Mitigation Segment EP-1 would avoid the majority of marshlands of Suisun Bay and the Grizzly Island Wildlife Area. This route configuration would, therefore, result in less overall impacts to special status species than the Existing Pipeline ROW Alternative alone, and similar impacts to the Proposed Project route.

D.4.4.3 Marine Biology

The impacts of the Existing Pipeline ROW Alternative to marine resources essentially would be the same as the impacts of the Proposed Project. The same mitigation measures would be required.

D.4.5 Environmental Impacts of the No Project Alternative

Vegetation and Wetlands, Wildlife and Aquatic Species, and Special Status Species

The No Project Alternative would result in no new pipeline construction and would require the use of the existing Concord-West Sacramento pipeline and the Concord-Stockton-Eastern Sacramento pipeline and potential occasional use of truck and/or rail transport. Although the existing pipeline would be used in the No Project Alternative, portions of the pipeline would need to be repaired and/or replaced as it is 36 years old. Ten percent (approximately six miles) of the Concord-West Sacramento existing line would need to be repaired and/or replaced. As described in Section D.4.1.3, the existing pipeline crosses Suisun Marsh, which contains large areas of salt marsh and seasonal alkali marsh. In addition, fifteen percent (approximately nine miles) of the existing Concord-Stockton-Eastern Sacramento pipeline would also require replacement. Repair and/or replacement of the pipeline within these areas would result in direct and indirect impacts to wetland vegetation types, especially in the sensitive marsh areas, which would be a significant impact (Class I). These wetlands could not be avoided as in the Proposed Project; however, it is not known exactly where these impacts would occur.

Impacts to trees and/or riparian areas may occur during pipeline repair and/or replacement, especially at creek crossings. However, as in the Proposed Project, riparian vegetation types could be avoided by boring at stream crossings. Impacts to non-riparian trees can likely be avoided, since maintenance activity has probably precluded the establishment of trees directly over the pipeline.

The No Project Alternative would also require the construction of additional booster pump stations along both existing pipelines. Each booster pump station would require between one and five acres of land, most likely occurring in undeveloped open lands. Permanent removal of non-sensitive vegetation types, such as annual grassland, ruderal area, and cultivated field, associated with these pump stations would be greater than the permanent removal of these communities from construction of the 40-foot by 75-foot launcher/receiver stations for the Proposed Project. This construction may not require permits, so no mitigation may be required.

Impacts to special status plant species may occur during pipeline repair and/or replacement along the existing pipelines. Unlike the Proposed Project, this construction activity may not be able to avoid special status plant species that may have become established over the pipeline. For the Proposed Project, impacts to special status plant species are considered significant, but mitigable (Class II) and can be reduced to less than significant levels. However, application of this mitigation measure to the required repair work on the existing pipeline would not occur, so this impact would be considered significant (Class I).

Despite the repair and replacement of sections of the existing pipeline, the No Project Alternative would still result in a higher potential for spills. Most of the existing pipelines (90 percent of each of the two lines) would remain and are 36 years old; as pipelines age their potential for leaks and spills increases significantly. In addition, the No Project Alternative includes the potential use of trucks and/or rail for product transport, which is also considered to have higher risk of product spill than use of a pipeline alone. Pipeline spills along the proposed lines would have a significant, but mitigable (Class II) impact on sensitive upland vegetation types, but may have a significant and unmitigable (Class I) impact on wetlands, depending on the size and type of spill. The potential Class I impacts to these communities would be greater for the No Project Alternative, due to higher spill frequency potential and the fact that it crosses through a larger proportion of sensitive vegetation types. Pipeline spills along the proposed lines may also result in Class II or Class I impacts to special status plant species, depending on the size, type and location of the spill. The No Project Alternative, however, has the potential to cause more significant impacts to special status plant species, upland vegetation, wildlife, and wetlands compared to the Proposed Project due to its higher spill frequency potential, the fact that it crosses more sensitive habitat, and that there is no authority to implement mitigation measures.

Potential pipeline repair impacts to special status plant species that may occur along the existing pipeline ROW would not be reduced to less than significant levels because mitigation is not assured. In addition, although a spill along either pipeline (existing or proposed) may have significant and unmitigable (Class I) impacts on sensitive species and vegetation types, these impacts have the potential to be greater under the No Project Alternative due to its higher spill potential and its proximity to a larger proportion of sensitive habitats.

Marine Biology

The No Project Alternative would be unlikely to have construction impacts affecting marine resources. Therefore potential degradation of tidal habitats from the introduction of contaminants or from increased turbidity due to disturbance of sediments, erosion or drilling mud release would not occur. However, under the No Project Alternative the existing pipeline would continue to be used and there would be the

potential for leaks or spills of petroleum products into marine habitats. In addition, trucks and trains could be used to transport petroleum products. These shipping methods have accident frequencies greater than those of a new pipeline.

As described for the Proposed Project, a product spill has the potential to have significant adverse impacts to marine resources. Assuming effective spill response, impacts of a spill to marine resources may be less than significant for a small spill (less than 50 barrels). However, for a large spill it is unlikely that the spill response would be as effective, so significant and unmitigable impacts would result. Because there is no authority to implement mitigation measures, existing regulations would guide cleanup and the impact on marine biology would be significant and unmitigable (Class I).

D.4.6 Mitigation Monitoring, Compliance, and Reporting Table

Table F-3 (in Section F) presents the mitigation monitoring program for biological resources.

Figure D.4-2. Wetlands